

Machine and Tool

BLUE BOOK

A DIGEST OF THE METAL WORKING INDUSTRY

AUGUST 1947

THIS MONTH

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A HITCHCOCK PUBLICATION

MARVEL Saws Speed-Up Deliveries



Steel warehouses and stockrooms deliver cut-off lengths in any quantity **FASTER—BETTER—CHEAPER** when equipped with **MARVEL 6A and 9A Automatic Hack Saws**. Far faster, floor to floor, than any other hack saws, they save valuable machine hours by reducing cutting-off time to a fraction—save other machining hours by producing accurately cut pieces of exact length.

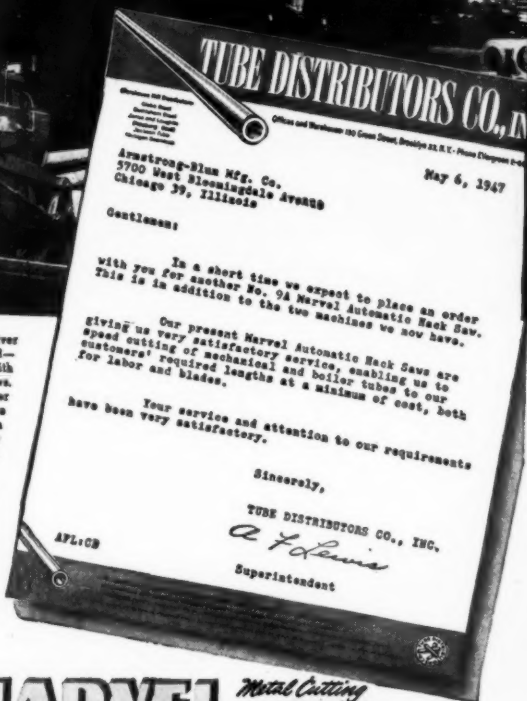
There is a **MARVEL Saw** for every need—in every capacity range and price class. Your local **MARVEL Sawing Engineer** will gladly study your metal sawing problems and requirements and make recommendations as to methods and equipment.



MARVEL
Better Machines—Better Blades

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SAWS



Your production
will step right up
with **HOBART** welders
on the job.

Remote Control
makes the BIG
difference



Why is it so many welders are able to turn out more welding with Hobarts than any other single machine? That's a good question, and the answer is the real reason why so many more Hobart welders are sold where production and quality count most.

Remote control is the answer, a simple control that enables the operator to make fine welding adjustments right at his work. With Hobart, there's no need to return to the machine for readjustments—no lost welding time and unnecessary steps. And Hobart welding is quality welding, too, because the operator doesn't have a tendency to get by with incorrect welding heat. No sir, not while he has the control right at his finger tips.

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"One of the World's Largest Builders of Arc Welders"

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Hobart Brothers Company, Box TB-87 Troy, Ohio

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RIVETT

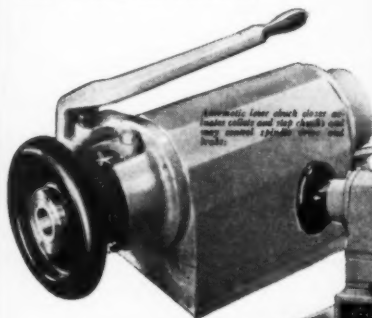
WHEN

COSTS AND QUALITY COUNT

THE *New* 918-S TURRET LATHE

If you machine small and medium sized parts from bar stock or on second operations—look to this new Rivett Turret Lathe. It is designed to buy its way into your plant with cost savings and quality control.

The 918S Turret Lathe cuts the initial cost of investment by taking work from larger machines. It follows by reducing the "dead time" of set-up and spoilage on

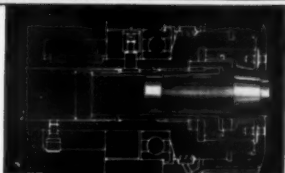


Automatic turret chuck slider on lathe holds work truer and more exact spindle drive and brake.

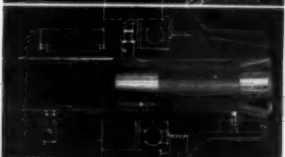
every job. Then it really pays with lowered time on every piece. How?—With the right spindle speed for efficient tooling, with quick means for chucking work, with properly grouped control levers and by reducing operator fatigue.

Features designed into the 918S Turret Lathe to guard quality include a rigidly mounted precision ball bearing spindle, precise tool indexing, hardened and ground steel bedways, vibration-free drive and mounting.

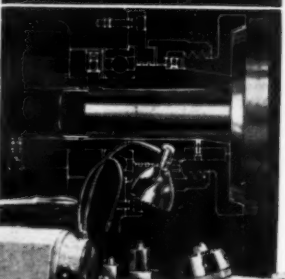
Write for Bulletin 918-ST



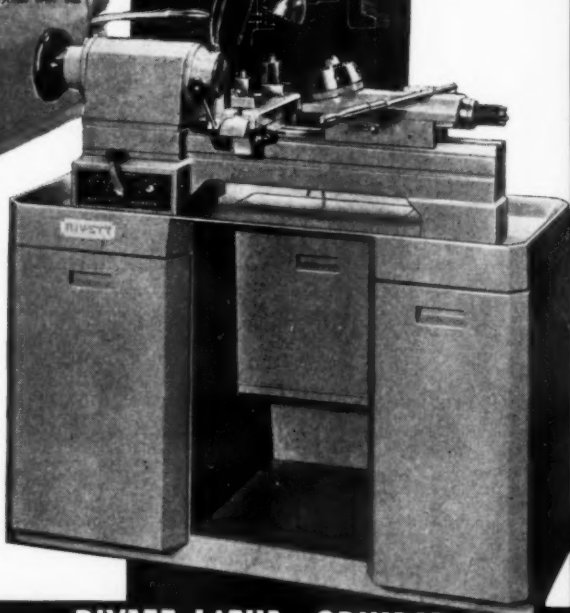
Stationary Collet — holds work without lateral movement to maintain perfect length on bar stock. Maximum capacity 1/4" round.



Draw-In Collet — new design holds work truer with greater gripping power. Maximum capacity 1/2" round.

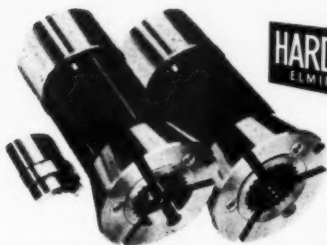


Stop Chuck — for accurate chucking of circular irregular parts requiring only a short grip. Maximum capacity 6" round.



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face are the same as a solid collet to give solid collet performance.



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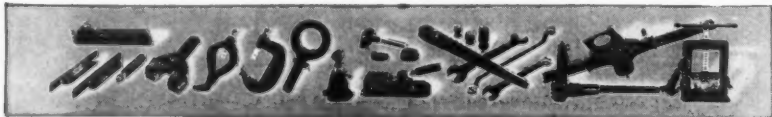
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PATENT NO. 2403861

CENTER DRILLS

**TIP
CLEARANCE**

**TIP
CLEARANCE**



This photo is 3 times actual size of a patented HY-CO J2 center drill.

TIP CLEARANCE PROLONGS LIFE

Center drill breakage can be reduced only when drills have "Tip Clearance", and only HY-CO Drills have this patented feature. Savings due to tip clearance are phenomenal. HY-CO Drill users (names on request) are reporting two to four times increased tool life, and some records (available) show savings up to ten times greater than with conventional center drills.

How Tip Clearance Prevents Breakage

Note from enlarged photo above and the side sketches, that there is a decreased load on the cutting edge. Due to tip clearance there is freedom from binding in the pilot hole, which combined with the greater spiral relief made possible by the drill contour, permits easier flow of chips and less danger of chip jamming. But longer drill life is not the only advantage of HY-CO Center Drills.

Band Contact abolishes out-of-round work

The Sphere-O-Form contour leaves a hole with convex sides. When the 60° machine center enters the curve it automatically establishes a true, never changing center of rotation. This **BAND CONTACT ABOLISHES OUT-OF-ROUND WORK** and provides increased lubrication for a cooler bearing between work and machine center.

HY-CO Center Drills not only outlast old style center drills, abolish out-of-round work, and increase machine center life, but they eliminate the need for type "B" drills by automatically providing the safety feature of ball-type drills. Write today for complete information, prices and nearest distributor—HOWARD H. HEINZ, INC., DEPT. 88, 2525 HILTON ROAD, DETROIT 20, MICHIGAN.



Due to tip clearance of the very tip of a HY-CO drill does the drilling Normal frictional heat less; it is created only tip—is dissipated on radial surface.



A finished center hole. The Sphere - O - Form contour abolishes **FATIGUE POINT**—the convex center hole enables the machine center to form a **BAND CONTACT** which eliminates galling machine centers.

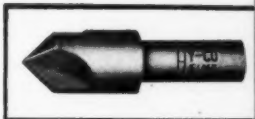
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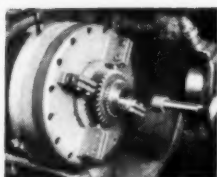


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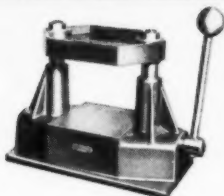
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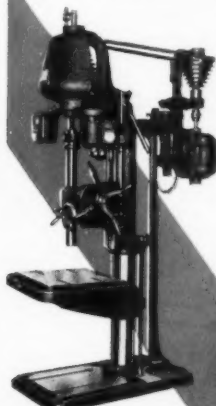
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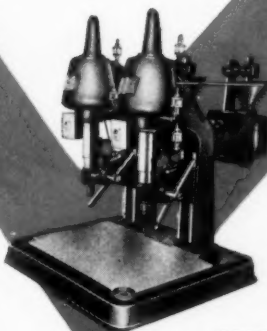


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1½" capacity, available in one through six spindle models, of full ball and Timken roller bearing design. High alloy steel, heat treated spindle, with positive geared motor and automatic stop for predetermined depth drilling. Also operates through lever power feed or worm wheel feed. Eight step Vee belt drive on tilting motor bracket gives sixteen spindle speeds. Table, column and base of semi-steel casting, finished and normalised.



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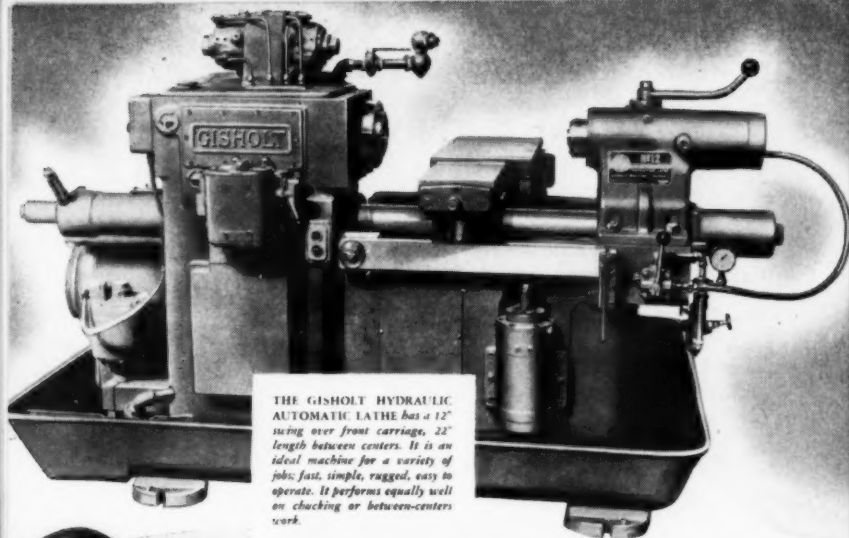
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FLEXIBILITY

in an Automatic Lathe

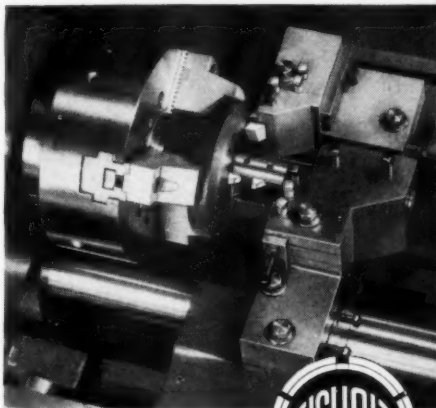
THE GISHOLT HYDRAULIC AUTOMATIC LATHE

Here, with the same basic tooling and slide arrangement, the Gisholt Hydraulic Automatic Lathe handles the machining of *three different types* of pipe flanges: threaded, Van Stone and slip-on. These flanges range from 1¼" to 2½" pipe size. The machine permits either straight or taper boring.

Such extreme flexibility is unique in a machine of this type. It is due to the ease of control and adjustment provided by the Gisholt Hydraulic Automatic Lathe. In setting up or adjusting tools, the operator has complete freedom of arrangement with regard to approach, feed, stop or return. He can do manually what is done by hydraulic pressure during the cycle of the machine.

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GISHOLT MACHINE COMPANY
1245 East Washington Avenue • Madison 3, Wis.



**Look Ahead... Keep Ahead
... with Gisholt**



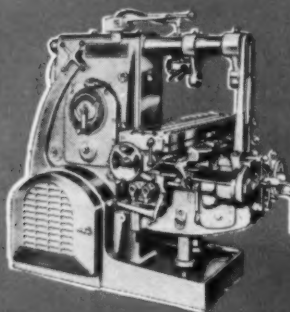
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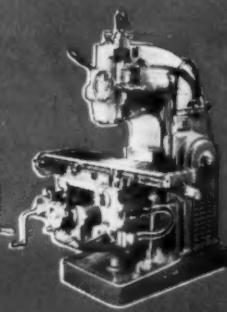
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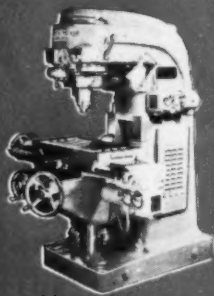
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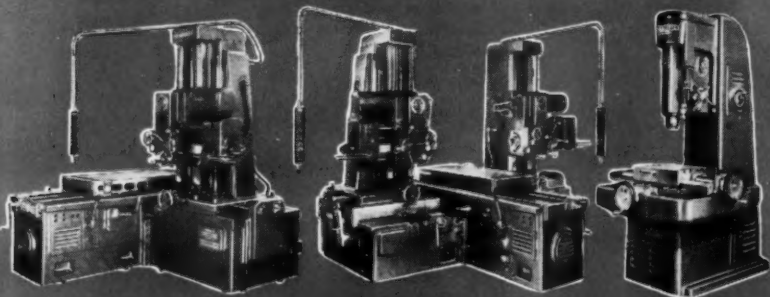
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and other great
new Kearney & Trecker
machine tools at the
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PRE-VIEW...

machines today... and you don't have to them... They're available right now!

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You can put the most exacting of "plus-or-minus tolerance" milling or boring jobs on either of these machines and be perfectly confident of top results. For single-spindle applications, the Model T machine provides wide working range. The Model No. 3TT can be used for performing precision milling and

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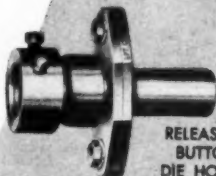


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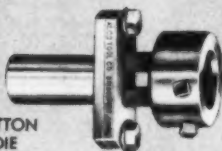


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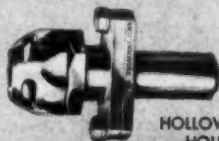
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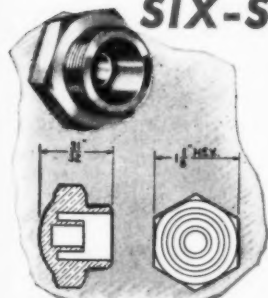
THE ALCO TOOL CO. 252 BIRDSEYE ST. BRIDGEPORT, CONN.
Chicago Office: 608 So. Dearborn St.—Phone Web. 2868

BASTIAN-BLESSING REDUCES COSTS WITH . . .



Two 1" and one 1 1/4" Greenlee Six-Spindle Automatics in the screw machine department at the Bastian-Blessing Company. These machines process a wide variety of parts for "Rego" precision equipment for using and controlling high pressure gases, for high quality soda fountain and counter ice cream equipment, and other products.

GREENLEE SIX-SPINDLE AUTOMATICS



**BRASS BACK-CAP FOR
HIGH PRESSURE GAS REGULATOR**

This piece has an internal tubular protrusion (the valve seat and valve stem spring guide) which is produced by a trepanning operation. Other forming, threading, and cut-off operations are conventional. Former machining time on the piece on single-spindle machines was 3 times greater than is now required on the Greenlee Automatic.

Here's another example of substantial savings made possible in manufacturing costs through the application of Greenlee Multiple-Spindle Screw Machines. At Bastian-Blessing Company of Chicago, production of brass parts has been stepped up as much as five times over previous output when single-spindle machines were employed exclusively. In addition, only a fraction of the floor space is required. Economical tooling and quick change-over features of the Greenlee are added advantages that contribute materially to production efficiency. For example, no cams are required to operate the main tool slide. Precision stroke adjustments can be made in less than five minutes.



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Send for a copy of this 20-page book explaining time-saving and cost-saving features of Greenlee Automatics. Ask to see the new 40-minute sound movie showing the building of a Greenlee "G" from foundry to finished machine.



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BOKUM BORING TOOLS



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TOOL NO. 12

Let us make up a handy box of large boring tools of your own selection of sizes and styles. The box accommodates nine sizes of high-speed cutting heads in each of the three styles interchangeable on the threaded shanks also furnished.

HERE'S THE TOOL for Boring Large Holes FAST — ACCURATE — EFFICIENT

It takes heavier bites—permits faster feed—doesn't chatter. Has great advantage over forged tool or boring bit. Has longer life. You regrind only one face. You'll never use any other boring tool, once you start using Bokum.

STYLE A—for general boring, STYLE B—for bottoming and facing, STYLE C—for internal threading.

Ask for catalog H-1139 for high speed steels—
catalog H-398 for carbide tipped



TRADE MARK REG. U. S. PAT. OFF.

BOKUM TOOL CO.

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SINGLE POINT BORING TOOLS—INTERNAL THREADING, BOTTOMING AND FACING TOOLS—CARBIDE TIPPED TOOLS

"American"

High Production Snagging Wheels

Improved Snagging Wheels, developed by "American" for either high or low speed machines, hog off surplus metal *faster!* Their rapid cutting action and clean stock removal lowers snagging costs on floor stands, swing, and portable grinders. These "American" Wheels are made with Carbolite or Aluminos abrasives and special bonds. —Vitrified for low speeds and Resinoid for high speeds. They have long wheel-life and are ideal for grinding steel castings and snagging forgings. Let us prove "American" Wheels will snag more units per day in your foundry—whether iron, steel or malleable.

Write for information.



New GOVRO-NELSON TAPPING UNIT



**MODEL
"KT"**

**NO CLUTCH
NO GEARS
NO LEAD SCREW**

Suitable for 0-80 to $\frac{3}{8}$ -16 taps, within limitation of 1725 RPM spindle speed.

Patented, centrifugal speed, suitable for any number of threads per inch without adjustment. Extremely sensitive feed.

Unit may be operated as high as 30 operations per minute.

Not a single purpose machine. May be used with any tap size within range.

This automatic tapping unit is completely self-contained. May be operated at any angle singly or in multiples, simultaneously or in sequence, or in conjunction with other equipment completely interlocked.

**WRITE FOR
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GOVRO-NELSON Co.

*Machinists of Precision Parts
for 25 years.*

**1933 Antoinette
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Automatic DRILLING UNIT

GRAND RAPIDS GRINDING MACHINES



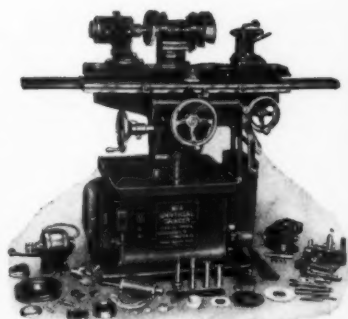
Grand Rapids Combination
Tap & Drill Grinder No. 10-B

DELIVER TOP TOOL ROOM EFFICIENCY

Whether you need a Universal Cutter and Tool Grinder or a Combination Tap and Drill Grinder, you can be sure of top tool room efficiency if they bear the name "Grand Rapids," manufactured by Gallmeyer & Livingston Co.

With the Combination Tap and Drill Grinder you have three ways: 1. On first cost, 2. Through lower maintenance expense, 3. On valuable floor space.

With Grand Rapids No. 4 Universal Cutter and Tool Grinder you can handle complex tool grinding jobs with maximum speed and convenience. Write now for bulletins 1045 and G. L. 9-15-44.



Grand Rapids No. 4 Universal
Cutter and Tool Grinder.



What "GRAND RAPIDS" Quality Means: Gallmeyer & Livingston cast their close-grained gray iron, machine to micrometric tolerances, precision-assemble grinding machinery of unsurpassed performance. *Grand Rapids* means top quality in grinding machinery.
GALLMEYER & LIVINGSTON COMPANY, 405 STRAIGHT ST., S. W., GRAND RAPIDS 4, MICH.

NEW **SUNICUT**

with PETROFAC*
contains no animal or vegetable fatty oils

The latest achievement of Sun's program of continuous research in the field of metalworking lubricants is an entirely new series of Sunicut cutting oils. These new oils, retaining the Sunicut name and the numeral designations of the grades they replace, contain a unique polar compound of petroleum origin. Called Petrofac, this product of Sun research, in combination with the other ingredients of the new Sunicut grades, imparts metal-wetting, chip anti-weld and extreme pressure characteristics unsurpassed by anything previously achieved. Petrofac is the most recent development in the field of all-petroleum metal-working compounds, in which Sun has pioneered since 1920.

In announcing these improved grades of Sunicut, Sun Oil Company wishes to thank the large number of companies in all branches of the metal-working industry that tested them extensively under practical working conditions.

No Variation in Quality. In the compounding of cutting oils, the use of lard oils, or other oils of animal or vegetable origin, has long been standard among leading manufacturers. Such oils impart many desirable characteristics. Unfortunately, because the sources of animal or vegetable oils are numerous and not under

***PETROFAC is a trade-mark of Sun Oil Company**

the control of the cutting oil manufacturers, variations in quality have been inevitable, especially during recurrent periods of shortage. To eliminate its dependence upon such a variable product, Sun Oil Company embarked upon its search for an all-petroleum substitute for animal and vegetable oils. The resultant product, Petrofac, is made entirely from petroleum. Sun controls its qualities from the crude through every stage of the exclusive process by which it is manufactured.

No Sudden Price Changes. Another disadvantage of dependence upon animal or vegetable oils is the frequency with which the supplies and prices of such oils fluctuate. The recent advance in the price of lard oil from \$0.90 to more than \$2.25 a gallon is typical of the kind of fluctuations from which Petrofac will free the users of Sunicut cutting oils.

Can't Turn Rancid. The improved grades of Sunicut contain no animal or vegetable fatty oils. Because Petrofac, which replaces the previously used lard oils, is completely of petroleum origin, it cannot support skin-irritating bacterial growth, cannot turn rancid, even with prolonged use. Petrofac is actually germicidal in action.

Finer Finishes and Longer Tool Life. The new grades of Sunicut are giving even finer finishes than were possible with the old grades. This is true on both high speed automatic operations and extremely heavy duty operations. Many users of the new Sunicut grades are reporting increased tool life as well. The superior metal-wetting properties of the new grades of Sunicut containing this unique polar compound account for these better results.

Extensively Tested. Over 125 different combinations of ingredients were tested in Sun's laboratories before the present Sunicut grades with Petrofac were released for extensive field testing under controlled conditions on every type of machine tool. Now many thousands of barrels of the new grades have been used by industry. From every user we get reports of performance equal to, or better than, that of the famous old grades of Sunicut.

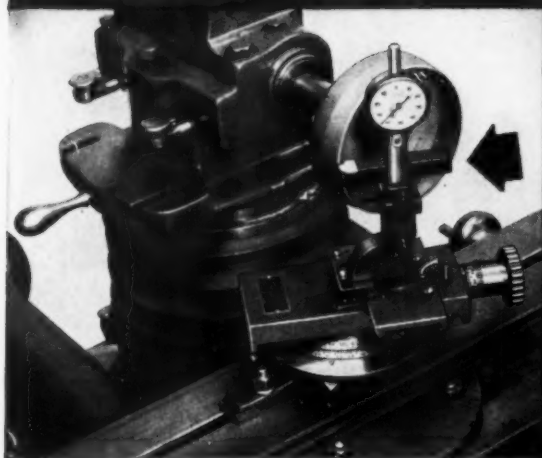
For further information about the performance of the new Sunicut grades phone your nearest Sun office or write Department MT-8.



SUN OIL COMPANY • Philadelphia 3, Pa.

In Canada: Sun Oil Company, Ltd., Toronto and Montreal

Easy to **Radiform** It...
No more hit-or-miss hand grinding



PATENT PENDING

The Meyers Radiform method is the modern way to reduce the time and cost of grinding intricate, high-precision form tools. Radiform eliminates the uncertainty of tedious, time-consuming hand grinding—at best a very costly, “hit-or-miss” method. You are always assured uniformly accurate results.

New, low prices for the Radiform have just been released. So write today for revised price list and complete information showing examples of how the Radiform can simplify your complex, expensive grinding operations.

Note: A number of good territories are open to qualified distributors.

W. E. MEYERS COMPANY - ESTABLISHED 1898
112 FOURTEENTH STREET • • • BEDFORD, INDIANA



JARVIS ROTARY FILES

TUNGSTEN CARBIDE
GROUND from the SOLID

In line with the growing use of Tungsten Carbide tools, the Charles L. Jarvis Company has developed over the past few years a Ground-from-the-Solid Tungsten Carbide file which, from past experience, has proven to be extremely economical wherever standard High Speed Steel Ground-from-the-Solid Rotary Files are used.

It is possible to make extreme claims as to the life and cutting speed of these new type rotary files and experience has proven that if these tools are carefully salvaged for regrinding, the rotary file costs can be cut to a fraction of the High Speed Steel files.

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THE CHARLES L. JARVIS CO., MIDDLETOWN, CONN.
TAPPING ATTACHMENTS • FLEXIBLE SHAFT MACHINES • GROUND ROTARY FILES
QUICK CHANGE CHUCKS AND COLLETS



More and More — they Re-tool with *Reltool*

The gradual, orderly expansion of the Reltool line has resulted in constantly increasing recognition and demand for these reliable metal cutting tools.

In metal working and manufacturing plants . . . in tool, die, and machine shops . . . complete satisfaction with a few items in the Reltool Line has resulted in the trial and adoption of other Reltool products. Today Reltool offers a wide selection of metal cutting tools in a full range of styles and sizes.

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INDUSTRIAL DISTRIBUTORS

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Reltool

CORPORATION
RELIABLE METAL CUTTING TOOLS

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MILWAUKEE 3, WISCONSIN

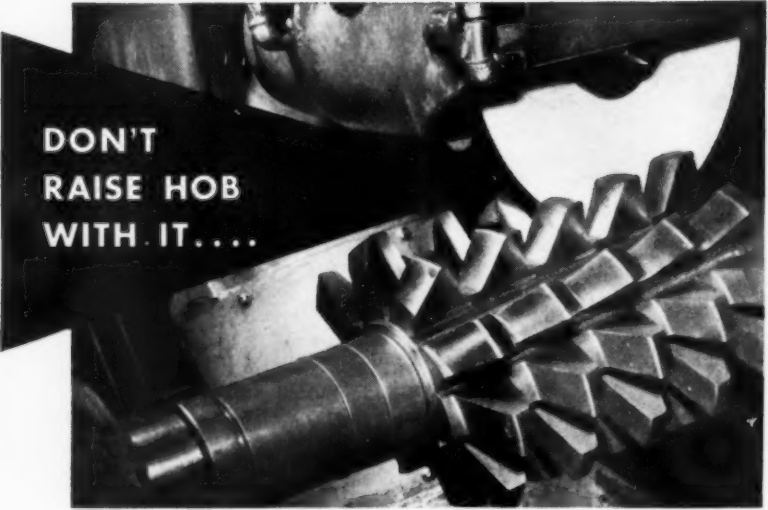


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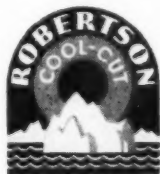




**DON'T
RAISE HOB
WITH IT....**

Grinding hobs, a tedious, time-consuming operation at best, becomes comparatively easy when you use a Robertson Cool-Cut Wheel. *Chip clearance?* The "open" structure of this revolutionary wheel allows more than adequate space for chip clearance! This means fast and cool grinding of hobs of any size, of the hardest steel.

Large hobs with $1\frac{1}{2}$ " or greater pitch may be successfully ground with a 10" x 1" x 1" WA46-J2V Robertson Wheel. On smaller hobs, a Robertson 7" x $\frac{5}{8}$ " x $\frac{3}{4}$ " RA60-J2V will give highly satisfactory results. There will





USE A ROBERTSON *Cool-Cut Wheel*

be no burning and very little heat generated. Experience has shown that you can expect a 50%, or greater, saving in grinding time when you use a Robertson Cool-Cut instead of a conventional wheel.

For faster and more accurate tool-grinding of any kind, make sure your grinding wheels are Robertson Cool-Cuts . . . the wheels that are precision-built for the toughest jobs. Write for your free copy of the pocket booklet "How to BUY PRODUCTION TIME," which tells you all about Robertson Wheels.

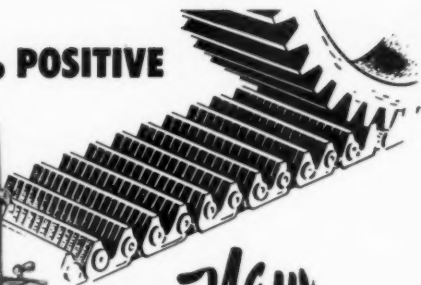
ROBERTSON

MANUFACTURING COMPANY, TRENTON 5, N. J.

Manufacturers of Vitrified-Bonded Grinding Wheels • Mounted Wheels • Segments

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So quiet... so smooth... so **POSITIVE**



... This *New*

SILENT CHAIN DRIVE

assures positive cutter rotation even at slowest spindle speeds!

Here's perfect linkage between spindle and speed reducer in the new Diamond M-30. This silent chain drive transmits peak power without slippage... even down to 75 r.p.m.! Enables use of big cutters and heavier cuts than ever, yet is as smooth, quiet and vibration-free as ordinary vee belts over its full spindle speed range.

The silent chain drive is just another of the many features that make the Model M-30 a favorite for both tool room and production milling operations.

For greatest economy in milling machines ask about both Diamond Models M-20 and M-30. Specifications of each are given below. Write for free bulletins!

MODEL	TABLE SIZE	LONG. TRAVEL	TRANS. VERSE TRAVEL	VERTICAL TRAVEL	SPINDLE SPEEDS	TYPE OF DRIVE	MOTOR WEIGHT	NET WEIGHT
M-30	7" x 30"	18"	6"	10"	Variable 75 to 1200 RPM	Silent Chain Variable Speed	1 1/2 hp Furnished	1300 lbs.
M-20	5 1/2" x 20"	12"	6"	9"	6 speeds 100-1400 RPM	Double Vee Belt	3/4 hp Recommended	750 lbs.

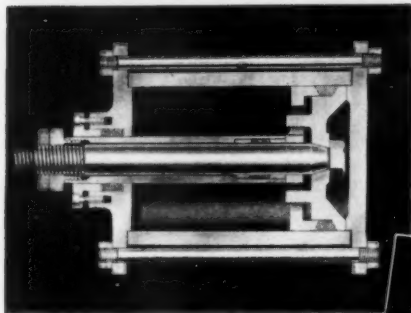
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Manufacturers of the Diamond Line of Precision Machine Tools and Accessories.



Standardized-



to save you
**TIME and
MONEY!**

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"leakproof"
CYLINDERS

The Hannifin line of pneumatic cylinders is complete! For quicker delivery and maximum economy, you can meet virtually any requirement with a standard Hannifin precision-built cylinder: 10 standard bore diameters to choose from, 1" to 12" . . . 6 basic mounting styles, also in double end styles . . . any stroke you specify, double or single acting . . . with or without adjustable cushioning for head cap, rod cap, or both.

PRECISION CONSTRUCTION. True-bored from steel cylinder stock. Honed to satin finish by exclusive Hannifin long stroke honing process.

EASY MAINTENANCE. Series "R" cylinders (illustrated above) feature Hannifin's exclusive external adjustment design which permits tightening piston packing without disturbing any internal parts.

"HIGH EFFICIENCY" PERFORMANCE. You get a combination that can't be beat for smooth operation . . . low friction loss . . . freedom from air waste! For the complete story, ask for a copy of Hannifin Bulletin No. 57-Z.



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Air Cylinders • Hydraulic Cylinders • Hydraulic Presses
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You get these *extra* features in the **JOHNSON** METAL CUT-OFF BAND SAW

***extra* CAPACITY** — 10" high, 18" wide — The added inch or two that can save so much trouble on the occasional extra large job. Takes heavy bars, tubes, angles, flats, gang cutting on small stock.

***extra* STABILITY** — because of the three-point support — no wobble, no twisting strain on bed. Uneven floors don't matter with the Johnson. Move it anywhere you like — castors optional.

***extra* ACCURACY** — because of the unusual stiffness of the machine, and wide guide rolls rigidly held. Cuts square and smooth, and close as you like to finished dimensions. Saves metal and machining time.

***extra* LONG BLADE LIFE** — because the extra large band wheel causes very little twist of blade, and the extreme rigidity of the machine prevents unusual strains on the saw.

Here is a machine that looks as modern as it is — substantial, stream-lined, stable, with that finer finish, greater weight, greater refinement of control, greater dimension of bearings all round, greater convenience of operation, which means it will do more and better work in any shop, all at little or no more first cost. Available with wet cutting attachment if desired.

Ask your dealer or write us direct for illustrated bulletin.

***extra* CONVENIENCE,**
too — faster vise operation, all controls in reach of operator, fine, hydraulically controlled feed adjustment, four speeds, quick-operating stock stop for duplicate work, automatic motor shut-off at end of cut.



JOHNSON MANUFACTURING CORP.
616 CHRYSLER BLDG.,
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**Keep Cutters Sharp
With the ACE**

2 Models For All Cutter Sharpening

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The "ACE" Tool and Cutter Grinder has proven its worth in toolrooms around the world — **GETS MORE PRODUCTION** — Cutters stay sharp longer . . . less down time for changes . . . **MORE ECONOMICAL**—the average life of a cutter is longer . . . fewer replacements. **MORE ACCURATE** — Cutters sharpened on the "ACE" have all teeth uniformly ground and all teeth cutting.

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**IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION**

**OLIVER
OF
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PRODUCTS

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**AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
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GRINDERS—DIEMAKING MACHINES**

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for

ANY SHAPE

... ANY CONTOUR

ANY RADIUS

(INTERNAL, EXTERNAL)

CUT THEM ALL

EASIER, FASTER

with **BARNES**

ARC LINE

BAND SAWS



YOUR contour saw, irrespective of make, is one of the greatest money-saver machine tools developed in recent years. The work this machine is specially designed for—and particularly radius cutting—is most severe on the band saw blade. It is under such conditions that

Barnes Arc-Line Band Saw Blades operating on your contour saw mark the important difference between ordinary performance and **maximum performance**. Correct tooth form, uniform set, proper hardness and temper built into all Barnes saws, plus experience gained through over a quarter century of manufacturing metal saws exclusively, assure you that **maximum performance**.



The Barnes industrial distributor near you has complete stocks of Arc-Line saws sturdily packed in 100-ft. coils. Cut yourself a saw from one of these handy coils and prove to your satisfaction that Barnes Arc-Line delivers maximum performance all ways.



ESTABLISHED 1919

W. O. BARNES CO., INC.

DETROIT 14, MICHIGAN

FOR EASIER, FASTER, BETTER CUTTER GRINDING

USE "KNOCK-OUT" FIXTURES

TAP GRINDER



LARGE WORK HEAD



K. O. LEE CO.
ABERDEEN, SOUTH DAKOTA
IF IT'S A LEE... IT'S A "KNOCK-OUT"

... more production per MAN HOUR
with BETTER GROUND TOOLS!

Industrialists and labor leaders—economists and politicians—YOU and I agree that we need more production at lower cost. YOU can get more production per man hour with better ground tools—tools sharpened on "Knock-Out" cutter grinder fixtures designed to do a better job faster and easier.

Sturdy, compact tap grinding fixture accommodates taps from No. 8 to 2½", 2 to 6 flute. It is adaptable to any make of tool grinder.

This large sensitive ball-bearing workhead is fully universal and may be used on any make of tool grinder. Various collets, straight sleeves and taper sleeves are available.

The "Knock-Out" Tap Grinding Fixture (above) handles all taps from No. 8 to 2½"—grinds chamfer and flute—reconditions broken taps. You get more pieces per grind and more grinds per tap! With the "Knock-Out" Sensitive Work Head (right) it's easy to grind tools from keyway cutters to 12" mills. Set-ups are simple and fast—grinding is accurate—tools produce more pieces. These, and many other "Knock-Out" cutter grinding fixtures, will help you obtain better sharpened tools that will increase production per man hour.

ASK YOUR "KNOCK-OUT" DEALER OR
MAIL THE COUPON TODAY FOR DETAILS

K. O. LEE COMPANY: 1119 First Ave. S. E.

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Gentlemen:

Please send us your fully illustrated catalog showing all of the various Knock-Out cutter grinder fixtures.

Name.....

City.....State.....

HERE'S HOW...

TO GET MORE PRODUCTION
FROM EXISTING MACHINES

CULLMAN *Speed* REDUCERS

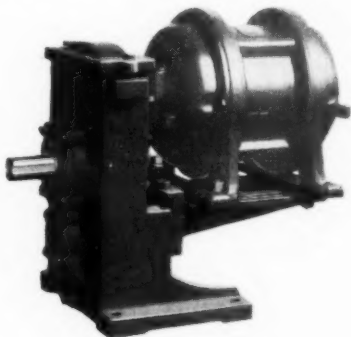
ADAPT ELECTRIC MOTORS TO SLOWER OPERATIONS

New Low-speed Range
For Motors $\frac{1}{4}$ To 15 h. p.
Fit Speeds To Job Needs



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Get the facts! Ask for this helpful booklet which contains much useful data and facts for buyers. It describes Cullman Speed Reducers and other Cullman products.



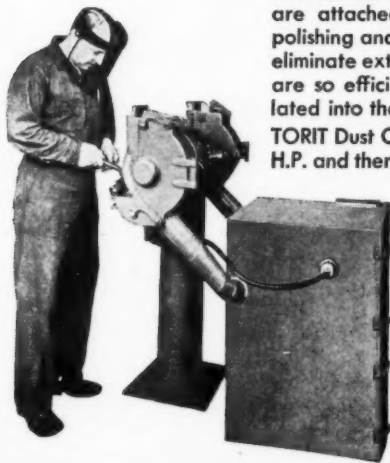
Any standard electric motor can be adapted for many new uses by adding a Cullman Speed Reducer. Compact, dependable, efficient—Cullman Speed Reducers are made in single and double reduction types. Cullman units are equipped with Helical Gears, Roller Bearings, Sprockets and Roller Chains all operating in oil. *Installation is simplified by convenient motor mountings.*

CULLMAN WHEEL COMPANY

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The dust in your plant also slows
production. Solve this problem with
TORIT DUST COLLECTORS



Self-contained and portable, Torit Dust Collectors are attached to, and operate with grinding, polishing and other dust-creating machines. They eliminate extensive piping, idle running time, and are so efficient that the cleaned air is recirculated into the room.

TORIT Dust Collectors range in size from $\frac{1}{3}$ to 3 H.P. and there are types for every purpose. They are now being produced in quantity so that immediate delivery can be made on all standard models. For complete information and the latest TORIT catalog write:

TORIT

MANUFACTURING CO.
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SawMore

METAL CUTTING SAWS

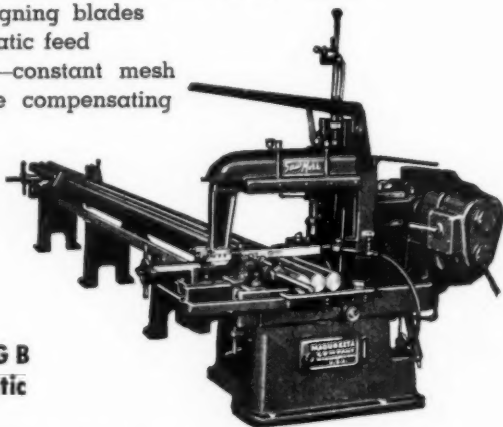
Fast Metal Cutting **.....MADE EASY!**

If it's speed you need . . . SawMore Metal Cutting Machines are your first choice.

SawMore Machines cut accurately. Operate at lowest cost.

These highlight features—built into every SawMore Machine—help you achieve top production.

- Self-aligning blades
- Automatic feed
- Gears—constant mesh
- Positive compensating feed

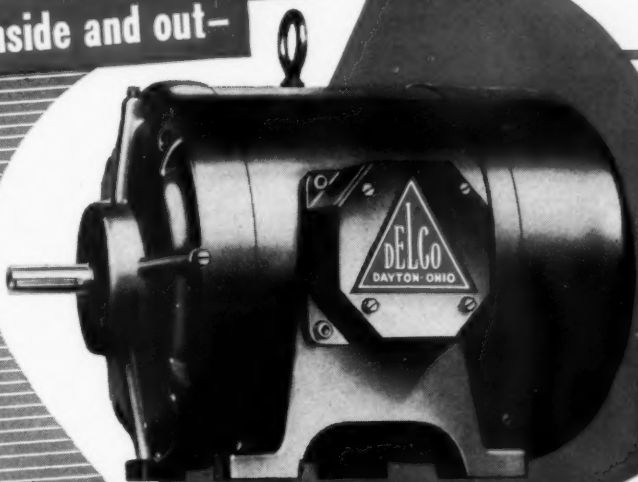


Model G B
Automatic

Get complete information on the advantages of SawMore Machines—Send for new 1947 catalogue.

MAQUOKETA COMPANY
CLARK ST. MAQUOKETA, IOWA

inside and out—



a production man's motor

**Standout features of
the new**

DELCO MOTOR

Totally enclosed; fan-cooled.

Individually taped coils.

Thoroughly insulated windings.

Unit-cast, ball-bearing rotor,
dynamically balanced; parts inter-
changeable end to end.

Double-shell frame with new
simplified cooling system.

Extra-large conduit box; can be
made watertight by addition of
gasket; usable in four 90-degree
positions.

Extended, accessible mounting
feet, cast as a unit with main
frame.

From its individually taped coils to its totally enclosed frame, the new Delco motor meets specifications for a power source that will keep machine tools humming shift after shift without costly stoppages or troublesome repairs.

The new Delco motor is easier to attach to tools, and usable in four 90-degree positions. It is cooler-running, thoroughly insulated and thoroughly protected against dirt, dust, sand and scale. Only a minimum of maintenance is required, and that is simply and easily performed. From every standpoint, this new motor gives production men what they've asked for.

If it's better production you're interested in, write for all the data on this great new Delco motor.

DELCO

DIVISION OF GENERAL



MOTORS

MOTORS CORPORATION

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THEY'RE NEW! L-W Medium Duty 4-Jaw INDEPENDENT CHUCKS FOR SMALL LATHES

The bodies are semi-steel castings. Ground surface on face and outer edge. Steel jaws. Hardened and ground steps. Heat-treated steel screws.

RUGGED 8" MEDIUM DUTY
complete with wrench..... **\$21.00**

6" HEAVY DUTY \$16.95
complete with wrench.....

Also available for both sizes are completely finished, ready to mount adapter back plates with $1\frac{1}{2}$ "—8 thread suitable for some models of Atlas, Clausing, South Bend and Logan lathes, and rough adapter back plate castings which can be machined to requirements.

Finished adapter plate $1\frac{1}{2}$ "—8 thread for 8" Medium Duty Chuck..... **\$3.60**

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Rough adapter plate for 8" Medium Duty Chuck..... **\$1.50**

Rough adapter plate for 6" Heavy Duty Chuck..... **\$1.25**

4-JAW Heavy Duty INDEPENDENT LATHE CHUCKS

Sturdy, accurate. Hardened steel reversible jaws. Semi-steel body. Wide gripping surface, oversize, tough nickel steel screws, steel thrust bearings assure durability.

10" — **\$39.35** 14" — **\$50.40**

12" — **\$43.85** 16" — **\$66.25**

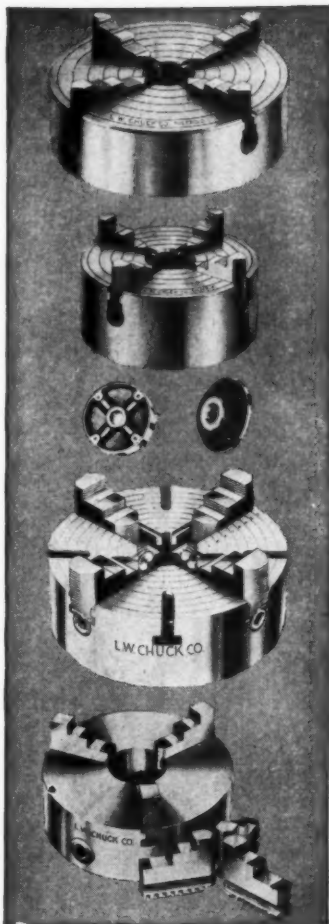
18" — **\$87.75**

3-JAW UNIVERSAL LATHE AND SCREW MACHINE CHUCK

For light or heavy duty work. Guaranteed to run true. Hardened steel reversible jaws. Semi-steel body. High grade alloy geared scroll and steel pinions.

6 $\frac{1}{4}$ " — **\$45.00** 7 $\frac{1}{2}$ " — **\$55.00**

10 $\frac{1}{2}$ " — **\$83.35**



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY 23 SO. ST. CLAIR ST.
TOLEDO 4, OHIO



"**ABRASIVE No. 1 1/2** hand-operated surface grinder has saved a lot of money for our shop . . . it completes the average short-run job in almost no time, and handles big work — 10" wide, 15" long and 12" high — that used to tie up our large, expensive, power operated machines. The No. 1 1/2 turns out as many as 25 different jobs in a day — grinds dies, flat work, gauges and tool-maker's jobs of highest precision. The men like the large handwheels and handy controls, but the most important feature is the spindle with the 1 h.p. motor mounted directly on it. This integral mounting gets rid of belting troubles, and eliminates practically all vibration. The ABRASIVE 1 1/2 has certainly proved a profitable machine in our shop".

Write for complete bulletin.



SEE US AT BOOTH 126—MACHINE TOOL SHOW
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ABRASIVE MACHINE TOOL CO.
EAST PROVIDENCE 14, RHODE ISLAND



Many Problems in Motion Can be Solved by the Use of **AIR as POWER**

No longer is the use of air power in many machine operations prohibitive because of slow action, massive bulk and limited stroke, not to mention the all important factor of economy.

Fenn custom-built air cylinders eliminate the traditional objections to the use of standard air cylinders. For instance —

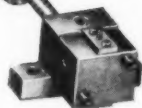
FENN does not manufacture a line of standard air cylinders.

FENN does design and produce in any quantity air cylinders to do a specific job efficiently and economically. FENN Custom-Built Air Cylinders provide accurate control of the piston velocity curve; they can be cushioned at either or both ends of the stroke; valves can be integral.

FENN cylinders will frequently deliver greater power from available air pressure with savings of space and with valuable air economy. Write us about your particular problem.

**Look at the Specifications of This
Air Cylinder Custom-Built by FENN.**

O.D. 11/16"
STROKE 42"
Speed 60 CY/MIN
VALVE INTEGRAL



The **FENN** *Manufacturing
Company*

**HARTFORD • CONNECTICUT
DEPT. G**



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Diags you in 'on
LOWER HACKSAW COSTS



with SIMONDS "Red End" BLADES



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SECRET of straighter, smoother cuts and longer blade-life is ACCURATELY TESTED TENSION.

NEW SIMONDS SIMOMETER enables you to tension any size blade correctly in a matter of seconds . . . and so get top cutting performance out of the top brand of blades — SIMONDS "Red End".

SEE HOW SIMOMETER SAVES SAW-DOLLARS! A Simonds Saw Specialist will demonstrate — on your own hacksaw machines — this easy-to-read tension tester. **NO OTHER METHOD LIKE IT.** Just call your distributor or the nearest Simonds office.

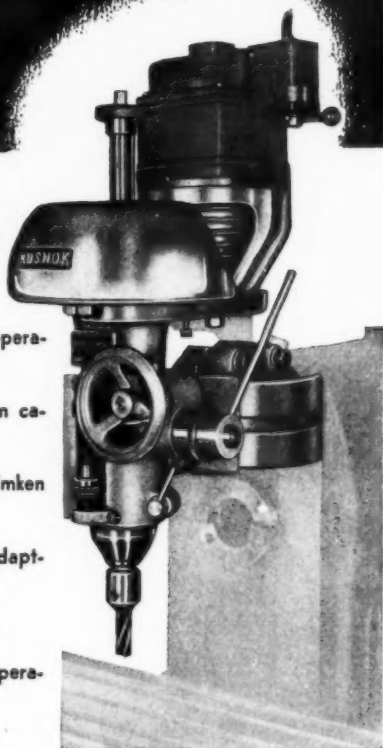
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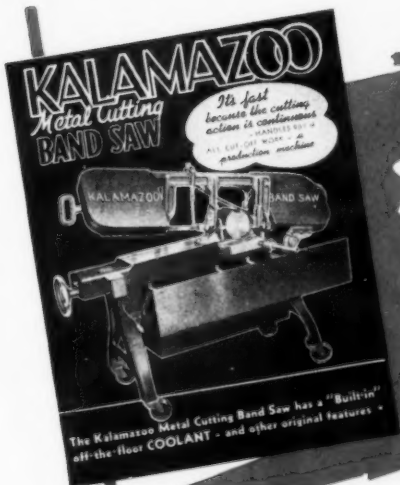
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ATTACHMENT

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can handle 90% of all
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Metal Cutting
BAND SAW

ASK YOUR
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MACHINE TOOL DIVISION
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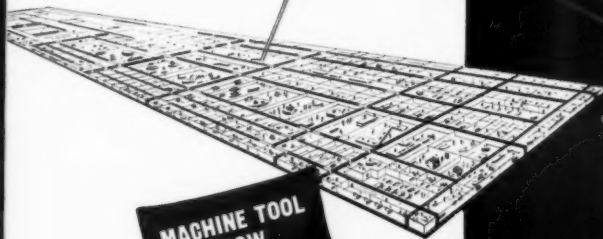
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BOOTH 417

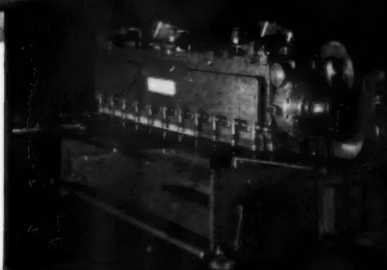


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DRESSERS & CUTTERS



**BALL BEARING
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More than 100,000 management, production, engineering, purchasing and financial executives will attend this first Machine Tool Show to be held in twelve years.

It's the World's Greatest Metalworking Show. It's being held in the largest manufacturing plant, under one roof, in the world.

There will be nightly sessions at which papers, covering the latest developments in metalworking techniques and processes, will be presented by world-renowned authorities.

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September 17-26 Inclusive

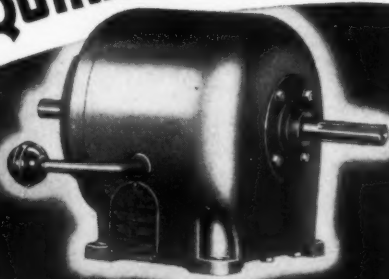
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AND MANY OTHER
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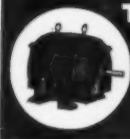


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Polyphase $\frac{1}{2}$ hp to 20 hp.



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LIMA PEDESTAL GRINDERS - LIMA ELECTRIC MOTORS





EASIER...AT 1/4 THE COST

THIS manufacturer of plumbing fittings was assembling valve parts by hand. "Why not by air power?", the Rotor Application Engineer suggested. Rotor screw drivers and nut setters were tried with success. Clamped in fixtures, these air tools drive stop washers, packing nuts, plugs, screws and bonnets into the valves with these results:

Cuts cost 75%. One operator assembles valves four to five times as fast as by hand.

Improves quality. Equipped with double adjustable

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Reduces fatigue. It's easy. Operator simply holds valve assembly while tool does the work.

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UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS





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AND ACCURACY**

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CUTTING PRACTICALLY
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Operates at higher speed—4,400 blade feet per minute. Smoother and faster cutting. Sturdy enough for foundries and production. Accuracy to spare for tool and die work, like contour sawed cams, dies, and punches; ideal for experimental laboratories and pattern shops.

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Blade guides adjust by a single control, and with full safety, even when machine is running. Close balance and light, but strong Textolite wheels permit twice the speed of other 14" machines. Less vibration, and longer bearing life. Saws wood two to four times faster. Often pays for itself in 3 to 6 months.

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Table: Tilts on Double Trunnions. Size $15" \times 15\frac{1}{2}"$.

Height Overall of Floor Model: 67".

Blade Widths: $3/16"$, $1/4"$, $5/16"$, $3/8"$, $1/2"$ and $5/8"$.

Length of Blade: 98".

Wheels: Disc. Moulded Textolite, 14" dia. 1" face.

Bearings: Grease-sealed Ball Bearings.

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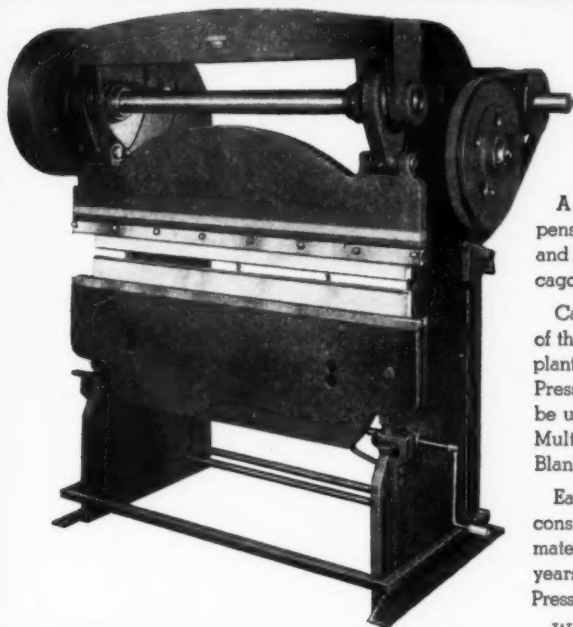
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Can handle 40 to 50 percent of the work done in the average plant, thereby releasing the larger Presses for heavier work. Can be used for Forming, Embossing, Multiple Punching, Notching, Blanking, etc.

Easy of operation, accurate and constructed of highest quality material and backed by over 45 years experience building Steel Press Brakes and Bending Brakes.

World's largest manufacturer of Steel Hand Bending, Power Bending and Power Press Brakes.

A dependable variable speed drive much desired by all users is standard.

A Small Steel Welded Construction Press Brake a brute for punishment and a prodigious worker for the Sheet Metal Plant—

—3 sizes—capacities 10 gage, 4 ft. long; 12 gage, 5 ft. long; 14 gage, 6 ft. long. Powered by 1½ h. p. motor.

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In 1936
This WAS AN ACHIEVEMENT
IN
Precision Workmanship



... but what
has happened since
?

Certainly, it looks like any ordinary plug gage, but this was one made of cemented-carbide—a real innovation eleven years ago when Lincoln Park was pioneering this type of work.

In 1936, carbides had been used extensively for cutting tools and other purposes and, in every case, had been responsible for distinct savings in production costs—savings which theoretically could also have been realized in precision applications. However, working with these wear-resistant materials to extremely close tolerances still presented many difficult problems. Lincoln Park went to work then to solve these problems, with the result that the company's principal activities soon centered on development and application of cemented-carbides to gages and other precision products.

And a lot has happened at Lincoln Park since that time. The use of carbides for many types of precision applications has

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Experience and ability—generally recognized as being unequalled by any other company—has been accumulated. A great amount of equipment designed specifically for highly accurate working of cemented-carbides has been installed. New and important developments—and most recently as applied to carbide dies—have been introduced regularly, and have met with wide-spread acceptance by American industry.

Today, as for the past decade, you'll find it to your advantage to go to the source where "precision workmanship with cemented-carbides" is day-in and day-out procedure. We'll be more than glad to discuss with you the many ways in which these materials can now be used to help reduce your costs of operation.



Lincoln Park **INDUSTRIES, INC.**
1731 FERRIS AVENUE • DETROIT 25, MICHIGAN

PRESS PRODUCTION



Photo Courtesy
Hotpoint, Inc.

FEEDS THE ASSEMBLY LINE

The Assembly Line—symbol of American Mass Production—depends on a rapid and constant flow of finished parts to each stage of the assembly.

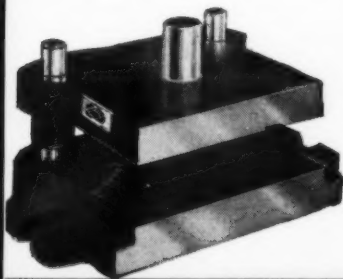
Largely responsible for keeping the line moving, Presses provide the fast, all-around production of duplicated metal parts that modern standards of production demand.

Danly Die Sets—a necessary part of good Presswork everywhere—speed die making programs, protect costly dies, cut down time for regrinds. Danly Die Sets and Die Makers' Supplies are nationally recognized for known dependable accuracy.

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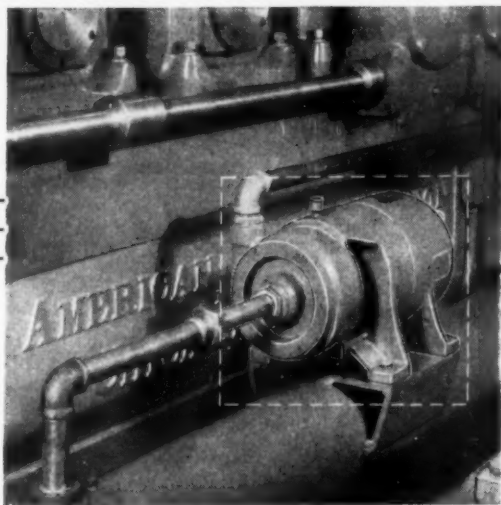
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Welded Steel Fabrication



"COOLER INSIDE" ALL SIDES



**COOLANT
PUMPS**

Coolants flow uniformly, gently, steadily to keep work and tool cool . . . inside, outside, all sides . . . to keep friction and heat at lowest practical points.

Photograph shows a FULFLO Model AG6M Pump mounted on a heat exchanger in a tube mill manufactured by American Electric Fusion Corporation, Chicago.

Let us hear from you . . . we can help on your coolant problems.

STANDARD OR SPECIAL MODELS

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There's a way to
Reduce Milling Costs!"**



But there is a way, Mister! Kempsmith Standard Attachments actually make it possible for you to convert your standard milling machine into a special purpose miller with all its inherent advantages . . . at the same time reducing production costs to a minimum. Precision-built, and backed by more than 57 years of specialized experience, Kempsmith Attachments, Arbors and Accessories have proven themselves year-in and year-out as dependable tools for almost any type of milling operation. Investigate today. Ask for literature. KEMPSMITH MACHINE CO., Milwaukee 14, Wis., U. S. A.

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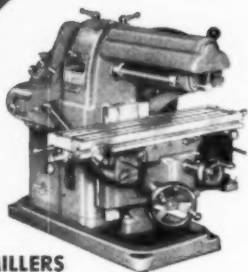
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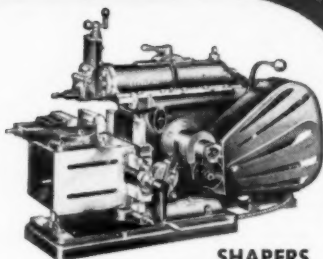


A 5156 IPA

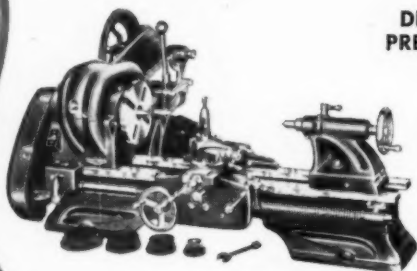
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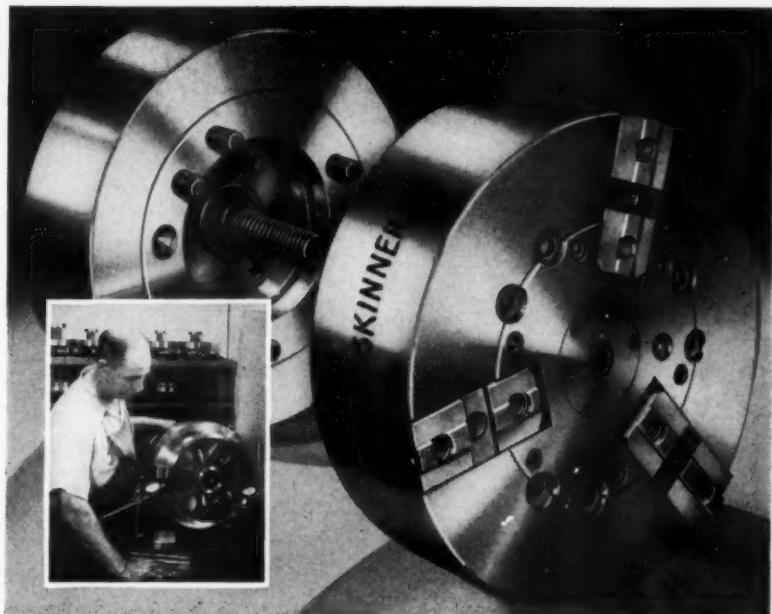
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Kalamazoo 13D, Michigan





FRONT & REAR VIEW SERIES 1300

PRECISELY, Mr. Jones - and faster, too!

Yes, Mr. Jones, a Skinner Power Chuck provides a means to chuck work quickly, easily and accurately. This means that a machine equipped with a Skinner Air Chuck will be removing metal more hours of every work day, but without burdening the operator. The increase in output will result in production-cost savings that will give you an edge in the increasingly competitive picture of today.

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Power chucking is a modern time-saving method that offers a simple way to greatly reduce your production costs. Skinner offers a complete line of self-centering and combination power chucks and

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Smooth

COMPACT

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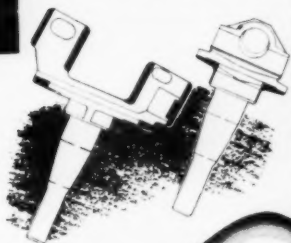
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TOOLED
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 FOR
Complete
Broaching
 OF THIS
STEERING KNUCKLE

**Broaches, Broach Holders and
 Pneumatic Fixtures were designed,
 built and followed in Production
 by Michigan**

Illustrated is one of 4 machines equipped by Michigan. Shows dual ram set up with pneumatic fixture at left in operative position, fixture at right in loading position. 16 surfaces and the king pin hole are broached to final finish in five passes.

What makes this a story? Just that Michigan can do the same for you—start with the part print and machine and place the job in production.

Let Michigan quote on your next job



**MICHIGAN WILL also DO
 THE COMPLETE MACHIN-
 ING OF YOUR PARTS**

Michigan is also equipped with the largest machine shop of its kind to machine and broach production parts for you.



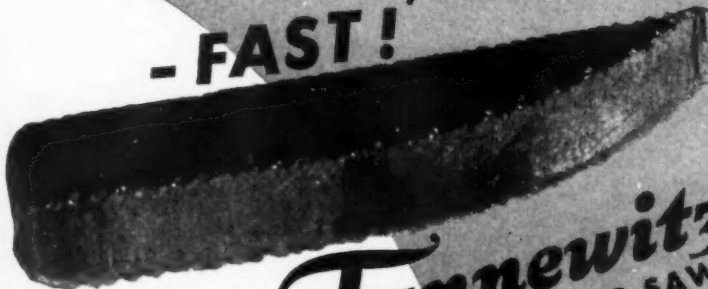
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for Sawing METAL as HARD as a FILE
or Trimming FORMED PARTS
- FAST!

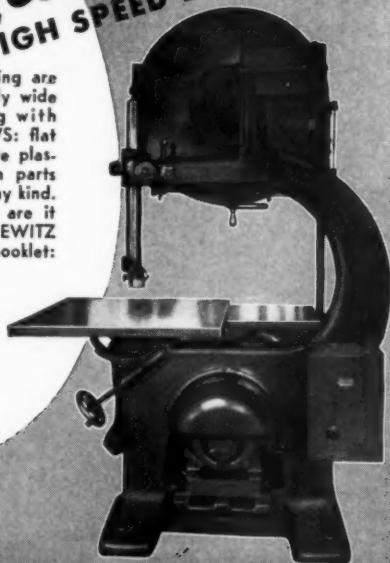


Actual photo of file
friction sawn on
Tannewitz High
Speed Band Saw.

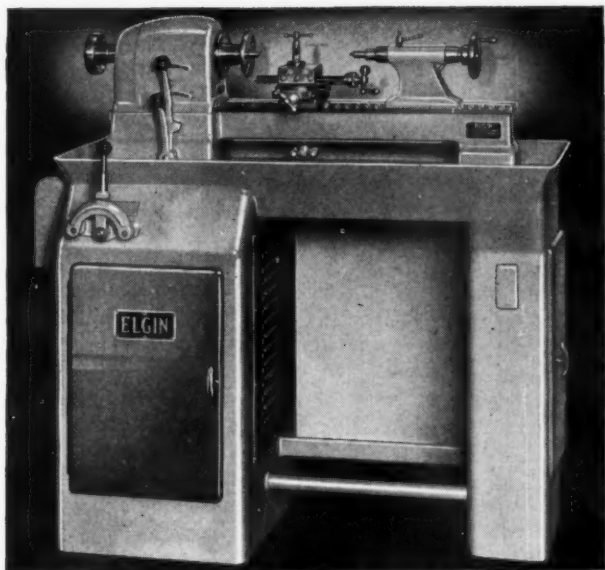
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HIGH SPEED BAND SAWS

Cost reductions that are downright amazing are effected in the cutting of an extremely wide variety of materials by friction sawing with TANNEWITZ HIGH SPEED BAND SAWS: flat sheets, hardened or soft steels, armor plate plastics, and many others. Formed aluminum parts can be trimmed without using a rest of any kind. Whatever your cutting problem, chances are it can be done faster and better with TANNEWITZ HIGH SPEED BAND SAWS. Write for booklet: "FRICTION SAWING."



THE TANNEWITZ WORKS
GRAND RAPIDS 4, MICHIGAN



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- The "Elgin Line" now is furnished with knee-hole bases with foot rests, permitting operator to sit comfortably, close-up and directly in front of work.
- Motor is mounted in base with direct cross ventilation.
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2 JOBS in TURNING and CENTERING with R and L Tools

**Can be —
changed from
RIGHT to LEFT
in 10 seconds**

This versatile tool does the work of 14 tools costing at least four times as much as R and L. You can handle a wide range of multiple operations with the R and L. Typical jobs include pointing work concentric with turned diameter; drilling and chamfering; turning and forming special shape or end of part while drilling or reaming; turning one diameter — chamfering two corners facing end of part along with drilling or reaming; turning two diameters while drilling or reaming. Turning shoulders concentric with stock diameter.

These are just a few of the worthwhile production savings you can realize with R and L tools. Delivery from stock.

*Let us send booklet describing all the uses of
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INGERSOLL will present new developments in

Carbide Tipped Shear Clear FACE MILLING CUTTERS

YOU WILL SEE the Ingersoll patented Shear Clear Face Mill with carbide tipped blades milling steel on an Ingersoll Milling Machine — a 91" diameter carbide tipped Shear Clear for aluminum — carbide tipped Shear Clears for high

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For complete information on Ingersoll Inserted Blade milling and boring tools write for Catalog No. 55E.

Write for Catalog No. 54E for complete description of Ingersoll Inserted Blade Cutter Grinder.

1947
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DODGE CHICAGO PLANT
SEPT. 17-26
INGERSOLL BOOTH
No. 58 (Next to Registration Desk)

THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILLINOIS



FINISHING CAST IRON



ROUGHING CAST IRON



ROUGHING STEEL



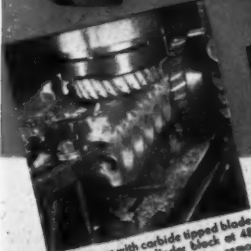
ROUGHING CAST IRON



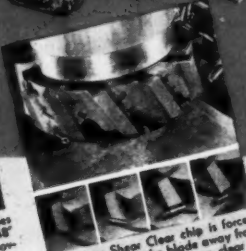
ONE CUT ALUMINUM



FINISHING CAST IRON



Shear Clear with carbide tipped blades milling cast iron cylinder block at 48" per minute feed, 275 ft./min., removing 1/8-3/16" stock.



Note how Shear Clear chip is forced to curl out along the blade away from finished surface and is thrown clear of cutter at end of cut. This action produces smoother finish, faster feed, longer tool life, and less power requirement.



Milling SAE 2320 test block with 10" diameter Carbide Tipped Shear Clear. 3/8" stock, 8" wide cut, 300 ft./min., 16" feed, 105 horsepower.

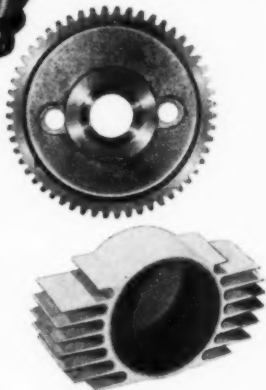
THE AL-FIN PROCESS

AND HEVI DUTY FURNACES



Three of nine Hevi Duty Holding Furnaces used in the AL-Fin processing cycle of bonding aluminum to ferrous metals.

IN chemically bonding aluminum to ferrous metals the temperature control of the aluminum alloy is of the utmost importance. To assure this necessary accuracy the AL-Fin Corporation of Jamaica, New York, use 9 Hevi Duty Electric Holding Furnaces. A few of the AL-Fin bimetallic assemblies are pictured, such as aluminum timing gear with bonded-in steel-hub, aluminum lined steel bearings and bushings and aluminum bonded finned assemblies. Many of the outstanding metallurgical developments of recent years, such as the AL-Fin Process, have used Hevi Duty Electric Furnaces in original development and subsequent production. A series of furnace bulletins detailing types, sizes and applications of the Hevi Duty line is available — send for them today.

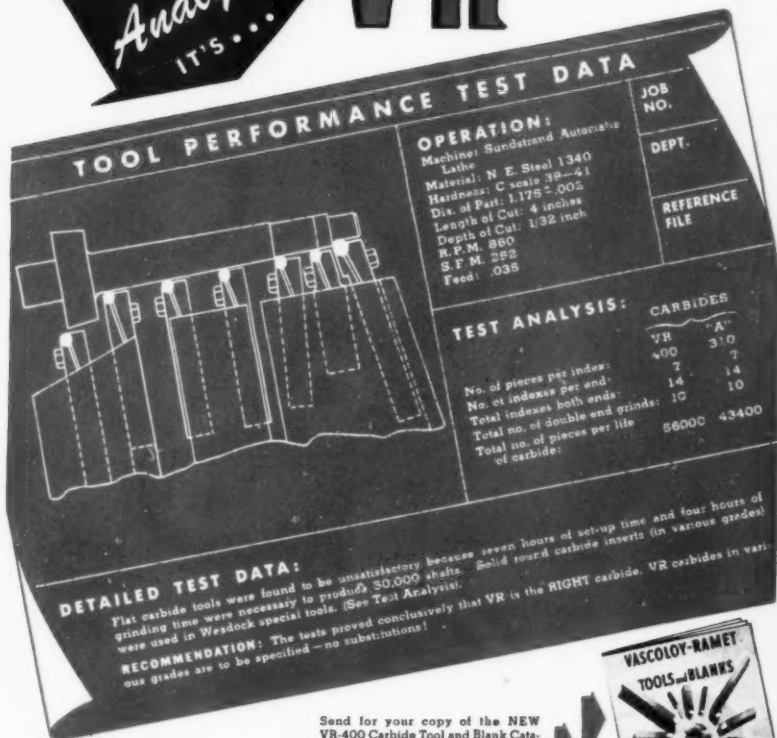


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Analysis*
IT'S...

* **V-R** Carbide
CONCLUSIVELY!



*Reg. U. S. Pat. Off.



Send for your copy of the NEW VR-400 Carbide Tool and Blank Catalog, 32-pages of important carbide tool engineering and buying information. A reference must for every tool engineer's reference file. Write today!

See V-R in action. Booth 317-J at the Machine Tool Show, Dodge-Chicago Plant



VASCOLOY-RAMET CORPORATION NORTH CHICAGO ILLINOIS
District Sales and Service in Principal Cities

An affiliate of The Pansteel Metallurgical Corporation and The Vanadium Alloys Steel Company

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

PRECISION AND COMMERCIAL GEARS

SPURS, SPIRALS, WORMS

Our specialized production methods include inspection of each gear at each stage of manufacture with our Orlandi Gear Checker. In commenting on our quality, customers report that only spot checking is necessary on Orlandi gears.

Send your gear prints. Let us quote and demonstrate what we mean by quality.



ORLANDI
GEAR & MACHINE CO.
14195 MEYERS ROAD
DETROIT 27, MICH.



Booth 37-D
Mach. Tool Show

**THE ONLY MACHINE THAT CHECKS
P.D. OF SPUR AND HELICAL GEARS
WITH PINS AND BALLS!**

Also checks ★ concentricity without master ★ concentricity and size of worm gear ★ tooth spacing ★ backlash ★ parallelism ★ P.D. of any thread form with 3 wires ★ diameter of gear and worm blanks ★ plug gages, arbors, etc., as a comparator.

Showing method of checking worm gear for size and concentricity.



ORLANDI
GEAR & MACHINE CO.
14195 MEYERS ROAD
DETROIT 27, MICH.

WRITE FOR OUR CATALOG

We'll be...

LOOKING FOR YOU

at



IN CHICAGO

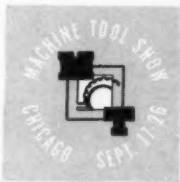
*** ACCURACY HEADQUARTERS**

Will be the Pratt & Whitney Booth at the Machine Tool Show. You won't want to miss a long visit at A. H. Q.

You won't be able to miss it; the P&W Booth will be one of the largest. 6,000 square feet of space crammed with P&W Accuracy at work . . . the newest in jig boring practice, surface grinding, gear grinding, thread milling . . . a whole section containing P&W Lathes . . . Keller machines in full operation, doing everything from small mold and die cavities to large automotive dies . . . a full line of P&W Die Sinkers and an exhibit of die jobs. There'll be Kellerflex machines demonstrating the phenomenal cutting abilities of the newest Keller Carbide Burs. See the newest taps, dies, milling cutters, reamers . . . and the latest P&W Gages, engineered for modern quality control or selective assembly.

There, too, you'll meet men who engineer P&W Accuracy into your tools. They'll be available for consultation on your precision problems. So we'll be looking for you at A. H. Q. Please feel welcome to come early and often and to stay as long as you can.

Booth No. 55 in the northeast corner



PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT



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INDEX VERTICAL MILLS

FOR THE TOOL ROOM OR PRODUCTION LINE

For use with end mills $\frac{1}{8}$ " to 1" in steel. Equipped with verniers, as standard equipment in addition to micrometer dials on table actuating screws for locating. Further accuracy available with rods and indicators which can be furnished as extra equipment.

If you want speed and precision on milling, drilling and boring send for a catalog on Index Mills.



Mfd. by
Index Machine
& Tool
Company

12" TOOL ROOM ROTARY TABLE



A quality tool for precision work in the tool room or production line, incorporating such features as ball bearings—hardened and ground worm—quick acting throw-out for free hand turning—single movement table lock that does not cramp table out of alignment—compound trough. 12" size only.

INDEX MILLS

Index Mills participated in all important war production programs from camera and guns to atomic bombs. Ask any owner how they like their Index Mill.

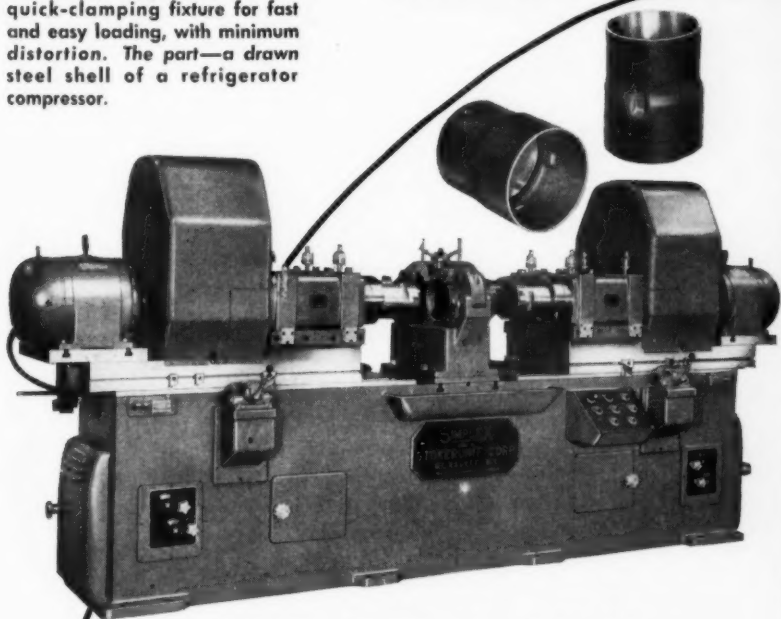
Write to Factory Sales and Distributing Agents for complete information.

BLANK & BUXTON MACHINERY CO.

3100 E. MICHIGAN AVE.
JACKSON, MICHIGAN

SIMPLEX

A simple and economical method of doing a difficult job—multiple tools for cutting efficiency—a quick-clamping fixture for fast and easy loading, with minimum distortion. The part—a drawn steel shell of a refrigerator compressor.



The machine shown is a SIMPLEX 3U 2-way Precision Boring Machine with four #4 boring heads, each carrying a multiple tool boring quill and an adjustable facing cutter. The parts are clamped in an equalizing fixture designed to hold the work securely with minimum distortion. Two pieces are bored and faced simultaneously, from both ends, reducing the cutting cycle to the time of the longest cut.

Precision Boring Machines

STOKERUNIT CORPORATION

SIMPLEX Machine Tools Division

4530 West Mitchell Street, Milwaukee 14, Wisconsin

Precision Boring Machines, Planer Type Milling Machines and Special Machine Tools

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Barnaby

SELF-CLOSING KNURLING TOOLS

FOR
Highest-Speed
PRECISION KNURLING

With these entirely DIFFERENT turret tools, you can knurl . . .

- Behind shoulders
- At any distance from end of work
- Without using back rests
- Without special camming or cam synchronization
- With minimum set-up time

Available in three sizes:

$\frac{5}{16}$ " shank diam.— $\frac{1}{16}$ " to $\frac{7}{16}$ " work capacity

$\frac{3}{4}$ " shank diam.— $\frac{3}{16}$ " to $\frac{3}{4}$ " work capacity

1" shank diam.— $\frac{1}{2}$ " to $1\frac{1}{4}$ " work capacity

BETTER



Free bulletin gives full details. Write for a copy!

BARNABY MANUFACTURING and TOOL COMPANY

70 KNOWLTON STREET BRIDGEPORT 8, CONNECTICUT

Are You Coming to the Machine Tool Show?
 You are cordially invited to visit Scully-Jones Plant. Call
 Lawndale 8770 for easy directions to the factory.

Make Quick, Accurate Adjustment WITH SCULLY-JONES ADJUSTABLE-ADAPTER-ASSEMBLIES FAST and EASY as 1-2-3

- ① Release set screw in the side of spindle.
- ② Release screw in nut.
- ③ Shorten or lengthen projection by turning the nut.

SPINDLE EXTENSION ASSEMBLIES—Styles 1880 and 1900—Furnished with Morse Taper Holes and Acme Threads on the shafts.

TENSION AND COMPRESSION TAP HOLDERS—Style "C" and "D"—Used on multiple spindle tapping heads to compensate for variations in lead of different taps.

CHOICE OF TAPERS—Adjustable adapter assemblies are furnished with Morse Taper, "NUT-EM-UP" or Stub Taper Holes. Acme Threads or Standard "V" Threads on the shafts.

In multiple spindle drilling and tapping, save time and money; eliminate trouble and delays; adjust drills and taps fast and easy as One, Two, Three.

Set-up is not disturbed. Accuracy is assured as spindle screw retains the adapter in position, and key furnishes the positive drive. These adapters are carefully heat-treated and ground to assure concentricity.

For complete information refer to page 38, and 64 through 78 of Scully-Jones Tool Engineering Manual 500, or write for details.

MOST STANDARD SIZES ARE CARRIED IN STOCK FOR

IMMEDIATE DELIVERY!

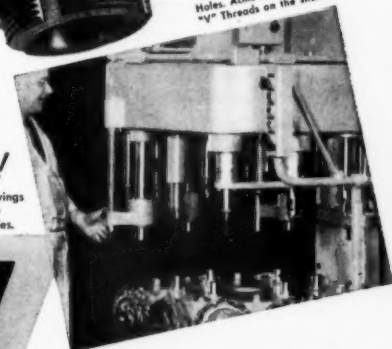
Are You Planning SPECIAL TOOLING? If so, please send your drawings and specifications early. Prompt quotations will be made and delivery dates can be met, thus preventing delays in your production schedules.

Refer to the Scully-Jones Catalog showing over 500 types and sizes of cutting tools, collet chucks, boring equipment, centers, etc.

Scully-Jones AND COMPANY

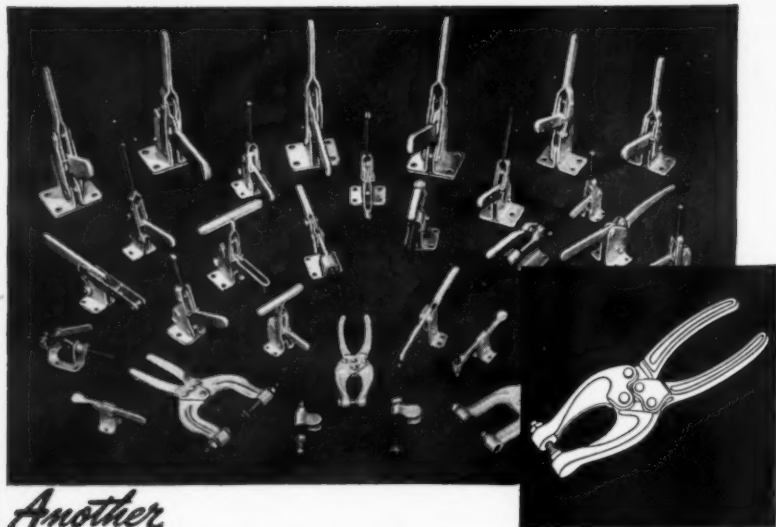
50, ROCKWELL ST., CHICAGO 8, U.S.A.

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TYPICAL APPLICATION—of Scully-Jones Adjustable Adapter Type Assemblies. Close-up of work head and index table of a Special Multiple Spindle Machine, Manufactured by The Cruss Co., Detroit, Mich.

2403



Another

DE-STA-CO CLAMP Designed to *Take It!*

A new addition to the versatile De-Sta-Co family of production clamping tools. No. 464 Portable Clamp designed for sheet metal work. Positive toggle lock holds parts fixed for drilling, riveting, welding. Speeds assembly of ducts, housings, cabinets, auto bodies. Ideal for template work.

No. 464 Plier Clamp offers a firm hand grip for opening and closing. Jaws clear flanged metal edges. Adjustable for efficient pressures. Narrow nose for close spaces. Entire tool is forged and can be altered easily for special application. Replaceable hardened steel bushings minimize wear. Write for additional information on Model 464, or catalog No. 47 describing complete line.

De-Sta-Co clamps are stocked in principal industrial centers

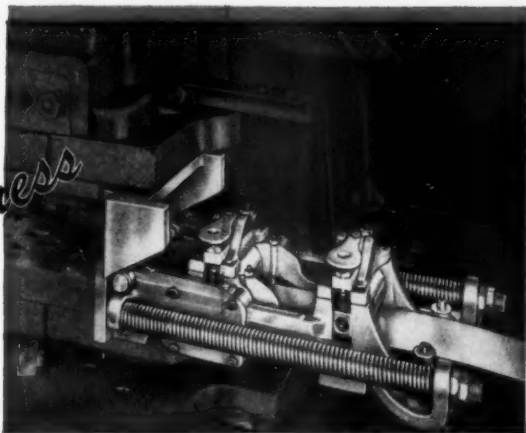
DETROIT STAMPING COMPANY

347 Midland Ave.

Detroit 3, Mich.

*Replace
Worn
Punch Press
Feeds*

with the
New Improved



DICKERMAN DIE FEEDS

at Considerable Savings

*Write
Today!*
For this new
Catalog



Dickerman Die Feeds cost much less than old-fashioned feeds and do more accurate, faster work.

They are interchangeable — can be mounted on any type punch press.

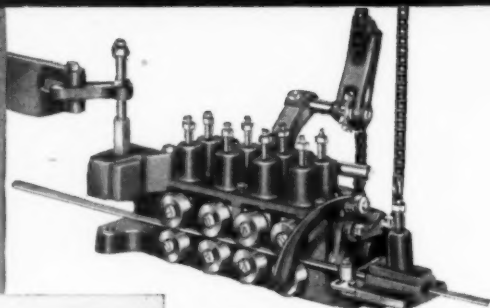
Their flexibility allows for feeding stock from any angle — front, back, left and right of punch press.

Maintenance expense is negligible due to the absence of wearing parts, also their accurate and rugged construction.

Send for free illustrated catalog today and get acquainted with profit-making Dickerman Die Feeds.

H. E. DICKERMAN MFG. CO.
221-23 ALBANY STREET • SPRINGFIELD, MASS.

WITTEK *Automatic* ROLL FEEDS AND REEL STANDS *For All Types of Punch Presses*



Assures Fast and Accurate Feeding of Coiled Strip Stock

Wittek-Automatic Roll Feeds provide maximum efficiency in the high speed automatic feeding of all types of coiled strip stock to punch presses. Highly flexible in function and application, they are capable of feeding lengths up to 24" per stroke of the press and will handle various stock thicknesses in widths up to the maximum width of the rollers.

Wittek Adjustable Reel Stands provide automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and back lash of stock. If your production problem involves feeding coiled stock to punch presses, consult us. Your inquiry will be given immediate attention. Ask for completely descriptive catalog.



WITTEK Manufacturing Co.

4305-15 W. 24th Place, Chicago 23, Illinois

Automatic
**ROLL FEEDS
AND
REEL STANDS**





Line reamer bushings, diameter 2.375", accuracy held to .0001".



Cast Iron Valve Stem Guide. $\frac{1}{8}$ to one thousandth removed—220 pieces per hour. Better finish and straighter hole.



Carburetor Idler Valve Jet. Hole is honed after reaming for smooth action.



Stainless Steel Load Compensator Valve Seat. Hole is honed to .0002" limit.



Will Solve Your Problems of Producing Straight Round Holes... Quickly, Economically

Used in hundreds of factories to size and finish holes from .120" to 2.625" in diameter in tools, dies, jigs, fixtures, thousands of production parts—and for maintenance and salvage operations.

Accuracy guaranteed within .0001"—more accurate than lapping and from 3 to 10 times as fast. Produce any micro-inch surface finish desired. In hardened steel, a finish of 2 to 3 micro inches can be obtained.

The Sunnen Precision Honing Machine maintains accurate alignment between tandem holes, operates without jigs or fixtures, can be set up to operate in less than one minute, corrects errors of out-of-round and taper, is easy to operate and low in cost.

Write today for literature—or ask a Sunnen engineer to show you its advantages.



SUNNEN PRODUCTS CO. • 7935 MANCHESTER AVE. • ST. LOUIS 17, MO.
Canadian Factory: Chatham, Ontario

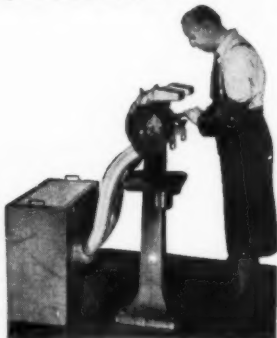
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STOP DUSTS



With Low Cost Individual **DUSTKOPS**

All types of dusts are stopped by Dustkops: Dusts from Grinders, Polishers, Buffers, Sanders (belt and disc), Abrasive Cut-offs; Woodworking Equipment; Fumes from Degreasers; Vapor from Screw Machines and Thread Grinders all can be stopped with least cost by **DUSTKOPS**.



*Send for 16-page catalog
and recommendations for
your dust problem.*

AGET-DETROIT COMPANY
205 Main at Washington
ANN ARBOR, MICHIGAN

MAXITORQ

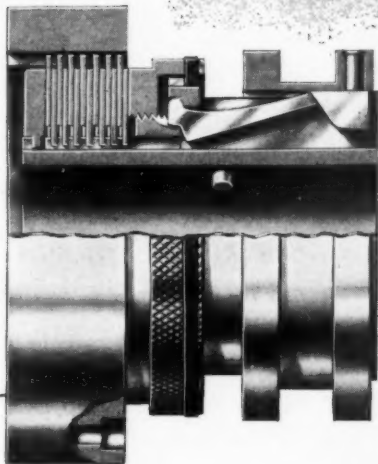
AT THE MACHINE TOOL SHOW WILL BE IN MANY BOOTHS

Performance characteristics of the Maxitorq Floating Disc Clutch under power, may be checked at the Machine Tool Show in booths displaying a variety of machines. If you are interested in their use on any particular tool we suggest that you investigate the following: High Speed Production Lathes, Automatic Lathes, Turret Lathes, Heavy Milling Machines, Grinders, Drilling and Honing Machines, Boring Mills, Chucking Machines and Automatics.

Maxitorq users include a large percentage of the "name" manufacturers of the country . . . with new ones being added steadily.

Maxitorq needs no tools for assembly, adjustment or take-apart. Separator Springs keep discs apart in neutral . . . no heating. Disconnect is fast and positive. Capacities to 15 H.P. @ 100 r.p.m. For engineering tables, diagrams, cutaway photos, etc., send for Cat. No. BB8.

Photo below shows new Maxitorq ring type Driving Cup for adapting clutches to various driving and driven members. No need to change bearing design . . . our quantity production gives you low cost for this close tolerance, hardened cup.



THE CARLYLE JOHNSON MACHINE COMPANY
MANCHESTER • CONNECTICUT

*Difficult Angles are
No Problem with*

HEIM

UNIBAL

**SPHERICAL BEARING
ROD ENDS**



Note the severe misalignment of the HEIM Spherical Bearing Rod End at the bottom of the connecting rod in the photo at the right. When the H. Leach Machinery Co., manufacturers of this unique roll feed mechanism, designed this drive, they chose the Heim Rod Ends not only to handle this misalignment, but also for their ruggedness and ability to carry the heavy loads required.

Our engineering department will gladly make suggestions for YOUR rod end or bearing problems.

Photo courtesy of
H. LEACH MACHINERY CO.
PROVIDENCE, R. I.

HEIM ALSO MAKES . . .

Unibal Spherical Bearings . . .
Roller Bearing Pillow Blocks . . .

Flanged Type Roller Bearings . . .
Die Polishing Machines.

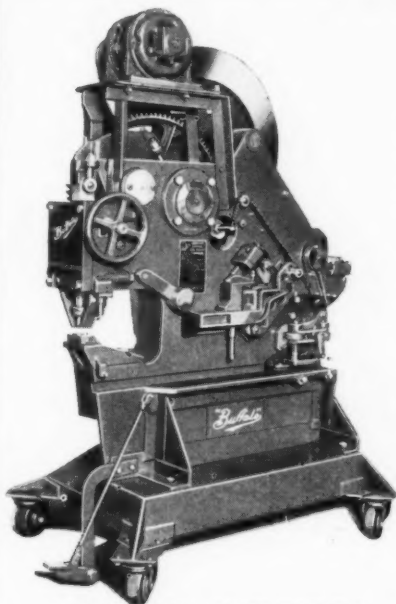
THE HEIM
FAIRFIELD,



COMPANY
CONN.

MAINTENANCE

on
Wheels



On husky casters, this "Buffalo" Universal Iron Worker can "Go to the job" where advisable, thus piling up big time savings in maintenance operations.

Railroads, shipyards, steel mills and many machine shops have an unprecedented heavy fabrication job—a job that calls for the highest order of efficiency, done by machines wherever possible.

The "Buffalo" Universal Iron Worker is doing just that—cutting, shearing, punching, copying rounds, angles, squares, beams, tees and special shapes in record time.

And three men can do three separate operations on it at once—giving you triple capacity.

On top of this, you have a movable unit. This saves added time in transporting extra heavy or cumbersome pieces for fabrication.

If you perform heavy maintenance, you will be time ahead — and money ahead with a "Buffalo" Universal Iron Worker!

Write Us Now For Complete Details!

BUFFALO FORGE COMPANY

161 Mortimer St.

Buffalo, New York
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

**Universal
Iron Worker**

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



Tops in 1879...

Still The Leader For 68 Years



**HARGRAVE
CLAMPS**



New Hargrave Carriage Clamp, stronger — more durable than malleable. Openings from 3 in. to 8 in.

When a line of tools leads the field in sales to industry for close to three-quarters of a century, there must be good reasons for it. And here they are:—

1. Constant improvement since 1879 with the aid of skilled mechanics from noted firms.
2. There is a Hargrave Clamp for every application.
3. A progressive manufacturing policy ever alert to new ideas and developments.

Constructed to take it, Hargrave Individually Tested Clamps insure top performance for maximum production.

WRITE FOR CATALOG showing the complete line of Hargrave Clamps—from 3/4 in. to 10 ft. openings, from 1/2 in. to 16 in. deep; also Chisels, Punches, File Cleaners, Washer Cutters, Brace Wrenches, etc.

See Your Nearby Industrial Distributor

1945 Waverly Ave.,

Cincinnati 12, Ohio



**No. 40 Forged Steel
Super Clamp
Heavy Service**



**No. 44 Forged Steel
Super Clamp**

The CINCINNATI TOOL Co.

**QUIET
ZONE
AIR
FILTERING**



***Stops
Corrosive
Moisture***

***You
KNOW IT
because you
SEE IT***

THE *New* NORGREN TRANSPARENT BOWL FILTER

gives your air tools and cylinders effective protection against corrosive moisture and emulsions as well as abrasive solids.

- Directional air inlet (Tornado Jet) imparts swirling motion, separating and throwing moisture to outside wall.
- Moisture runs down below baffle plate.
- Baffle plate divides bowl into ACTIVE and QUIET zones—active, where moisture separation takes place, quiet, where moisture accumulates for draining off instead of being driven along due to exposure to air turbulence.
- Reinforced Monel wire screen stops all solids.
- Transparent bowl shows condition of filter at all times.

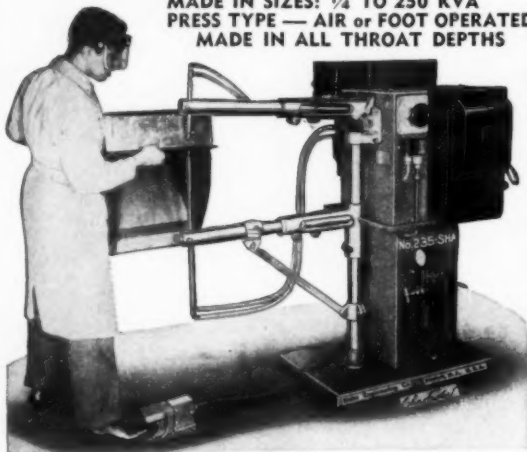
Write for Detailed Information. **C. A. NORGREN, 222 SANTA FE DR.
DENVER 9, COLORADO**

Norgren

SPOT BUTT ARC WELDERS

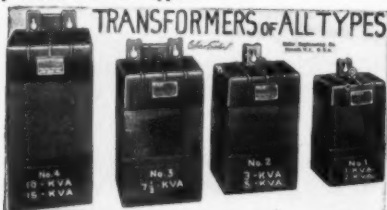
SPOT WELDER TIPS, HOLDER & HORNS
ASK FOR EISLER'S TIP & WELDER CAT

MADE IN SIZES: $\frac{1}{4}$ TO 250 KVA
PRESS TYPE — AIR or FOOT OPERATED
MADE IN ALL THROAT DEPTHS

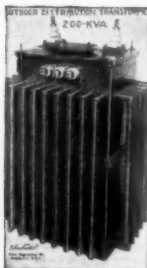


WE MAKE ALL TYPES OF TRANSFORMERS
SIZES FROM $\frac{1}{4}$ TO 250 KVA OIL COOLED TYPE

TYPES: Furnace, Distribution, Lighting,
Power, Auto, Phase Changing, Air, Oil or
Water Cooled, Reactors and Special Trans-
formers of all types.



TRANSFORMERS OF ALL TYPES



CHAS. EISLER
EISLER ENGINEERING COMPANY, INC.

762 South 13th Street (near Avon Avenue)
NEWARK, NEW JERSEY, U. S. A.



Arc Welders
100 TO 400 AMPS.



Butt Welders



Spot Welders



Spot Welders

FOOT, AIR
OR MOTOR OPERATED

SUPER **EJECTOR-TYPE TOOLS** WITH SOLID CARBIDE REPLACEABLE BITS

**SEE THEM RUN AT
BOOTH 676
THE
MACHINE TOOL
SHOW**

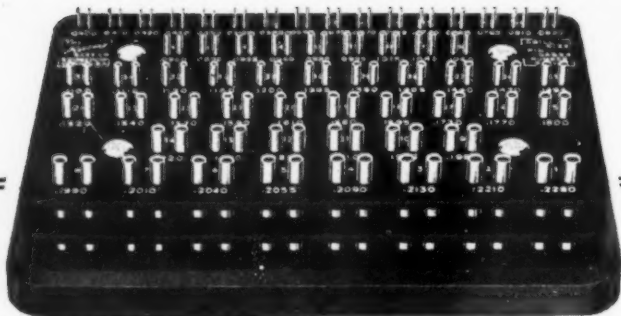
CHICAGO
SEPTEMBER
17th TO 26th
INCLUSIVE



SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Rd., Detroit 13, Mich. 5210 San Fernando Rd., Glendale 3, Cal.



DRILL SIZE PIN GAGES

Class Z Accuracy

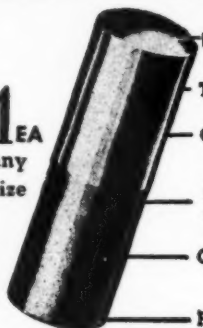
LETTER SET—52 gages in 26 pairs from A to Z. \$45 set.

FRACTION SET—60 gages in 30 pairs in steps of 1/64" from 3/64" to 1/2". \$50 set.

NUMBER SET—120 gages in 60 pairs from 1 to 60. \$90 set.

All sets include stands ... Prices F.O.B. Bridgeport, Conn.

\$1^{EA}
any
size



Polished Radius Top

TOLERANCE $+.0001 - .0000$

Overall Length 1 1/2"

LOWER HALF CONCENTRIC
TAPERED for easy insertion

Oil Hardened Tool Steel

Flat Ground Bottom

Sets in pairs of gages for checking any number of similar holes. Stands have 3 plates and cover so that gages stand upright. Drill size is plainly stamped in front of each gage hole, together with decimal equivalent to the ten thousandth of an inch.

IMMEDIATE DELIVERY — 116 SIZES

Check or M.O. should include .08c postage for quantities less than Set. Sets shipped Express Collect. No C.O.D.'s.

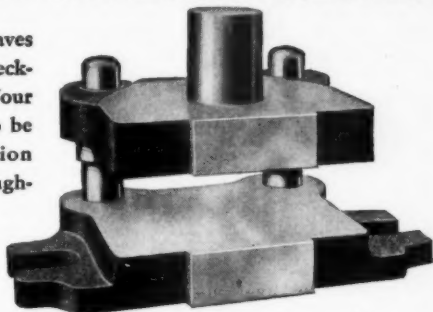
THE *Horberg* GAGE COMPANY

19 STAPLES STREET, BRIDGEPORT 1, CONN.



CHECKED .. FOR TROUBLE-FREE PRODUCTION

Not a single Die Set ever leaves Producto without a strict check-up of every vital point. Your specifications are orders to be obeyed . . . your production results will prove our thoroughness.



FROM NEAR-NEIGHBOR POINTS

To save you time, Producto stocks Die-Sets at major tooling centers from coast to coast. Select our nearest assembly and service plant from the list below.

and DOWEL PINS too

Make Producto your source of supply for the close tolerance die maker's accessories you need in a hurry . . . pins, springs, stripper bolts, screws, adapters, etc. All are neatly packed for easy identification.

THE PRODUCTO MACHINE CO. 980 Housatonic Ave. • Bridgeport 1, Conn.
Bridgeport 4-9481

SEND FOR
CATALOG No. 9



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635 Fulton St.
Lincoln 5385

CLEVELAND 14,
3200 Lakeside Ave.
Prospect 4236

SAN FRANCISCO 7, CAL.
Jamison Steel Corp.
Exbrook 2230

ELMIRA, N. Y.
R. C. Neal Co., Inc.
5168

DETROIT 11,
3017 Medbury
Plaza 3101

LOS ANGELES 21, CAL.
Jamison Steel Corp.
Trinity 9827

BALTIMORE 2, MD.
L. A. Benson Co., Inc.
Plaza 0340

PHILADELPHIA 40, PA.
Wright & Gade Tool Co.
Radcliffe 5-1467

NEW YORK 12,
197 Lafayette St.
Worth 4-7484

SYRACUSE 2, N. Y.
R. C. Neal Co., Inc.
3-1181

BUFFALO 2, N. Y.
R. C. Neal Co., Inc.
Cleveland 1110

ROCHESTER 4, N. Y.
R. C. Neal Co., Inc.
Main 5249

PRECISION CENTERED EYE BENDING

with

DI-ACRO BENDERS

DI-ACRO precision bending is accurate to .001" for duplicated parts. DI-ACRO Benders bend angle, channel, rod, tubing, wire, moulding, strip stock, etc. Machines are easily adjustable for simple, compound and reverse bends of varying radii.

Send for Catalog

"DIE-LESS" DUPLICATING showing many kinds of "DIE-LESS" DUPLICATING" produced with DI-ACRO Benders, Brakes and Shears.



Pronounced "DIE-ACK-RO"



O'NEIL-IRWIN MFG. CO.

314 Eighth Avenue
Lake City,
Minnesota

A Centered EYE in 1 Operation

The DI-ACRO Bender makes perfectly centered eyes from rod or strip stock at a high rate of production. Both eye and centering bend are formed with one operation. Any size eye may be formed within capacity of bender and ductile limits of material.

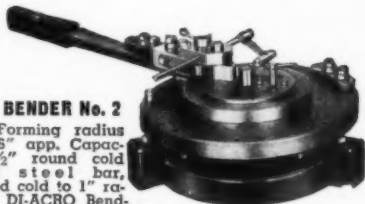
BENDER No. 1

Forming radius 2" app. Capacity 7/32" round cold rolled steel bar or equivalent. All DI-ACRO Benders have two-way action, right or left hand mounting and reversible forming nose.



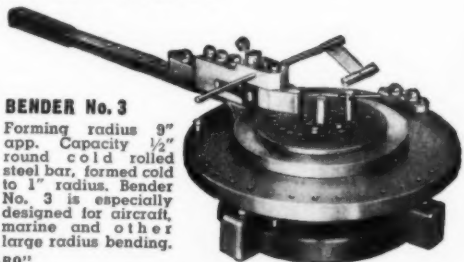
BENDER No. 2

Forming radius 6" app. Capacity 1/2" round cold rolled steel bar, formed cold to 1" radius. DI-ACRO Benders form bus bar and other strip stock both flat and edge-wise.



BENDER No. 3

Forming radius 9" app. Capacity 1/2" round cold rolled steel bar, formed cold to 1" radius. Bender No. 3 is especially designed for aircraft, marine and other large radius bending.





*Ball
Ends*

ANOTHER
Complete

PUTNAM LINE

42 DIFFERENT ball end mills in long and regular lengths—and all standard! They range from $\frac{1}{8}$ " to $1\frac{1}{2}$ " diameters—available in right- or left-hand cuts. All regularly stocked at Putnam

Distributors for fast delivery to you when you need them. In ball end mills, as in all other types, Putnam offers the country's largest and most complete selection.

Keep "on the ball" with faster-cutting, longer-lasting
Putnam End Mills — call your distributor today!



PUTNAM

TOOL COMPANY
2985 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

RACINE

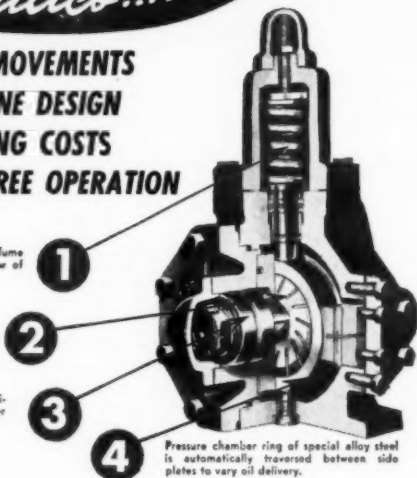
Hydraulics... FOR

**SMOOTH POWER MOVEMENTS
IMPROVED MACHINE DESIGN
REDUCED OPERATING COSTS
QUIET, TROUBLE-FREE OPERATION**

Spring governor provides automatic volume control, supplying only the needed flow of oil at a pre-determined pressure.

Tilted vanes cannot seize or gouge the pressure chamber ring. Constant efficiency is maintained.

Heavy duty pump shaft is mounted in anti-friction bearings for long life and power saving operation.



Pressure chamber ring of special alloy steel is automatically traversed between side plates to vary oil delivery.

COMMON APPLICATIONS FOR RACINE HYDRAULIC

EQUIPMENT

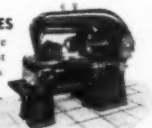
- Presses
- Machine Tools
- Wood Working Machines
- Steering Gears
- Welding Equipment
- Concrete Block Machines
- Plastic Presses
- Aircraft Equipment
- Special Machines

RACINE pumps will simplify your circuits. By-pass and relief valves with the accompanying extra piping are eliminated. Since RACINE pumps by-pass no oil, heating is reduced. Horsepower is saved. Quicker operation results. These features reduce installation cost and operating expense.

Let Racine hydraulic engineers review your applications. This service is available without cost or obligation. Write today, ask for catalog P-10-C. RACINE TOOL AND MACHINE COMPANY, 1754 State Street, Racine, Wisconsin.

RACINE Hydraulic METAL CUTTING MACHINES

A complete line in capacities 6" x 6" to 20" x 20" — in all price ranges. Features are simple. One lever control — open front design — progressive feed for cutting any metal from light tubing to tough tool steels. Write for Catalog No. 12.



RACINE

STANDARD FOR QUALITY AND PRECISION

*All Lovejoy Blades for
Type "A" Milling Cutters
are interchangeable from
4½" to 24" in diameter.*



DESIGN

A complete engineering service, backed by an experienced staff, is at your service to make recommendations and design special cutters.



RANGE

Hundreds of sizes, dozens of models to meet every requirement, regardless of machines used or materials to be cut.

SERVICE

Even special tools use standard parts which are stocked by us. There are 30 Lovejoy service centers throughout the U.S.A. — there is one near you.

SATISFACTION

Nearly 30 years' continuous experience making milling cutters and other "Positive-Locking" tools. Our first customers are still buying our tools.

LOVEJOY Type "A" Face Milling Cutters offer complete interchangeability of H.S.S., carbide and cast alloy blades in housings from 4½" to 24" in diameter. Thus you can take advantage of Lovejoy's prompt delivery of standard blades from stock — can eliminate the need for carrying large stocks of blades yourself. This feature, plus husky, forged steel housings, plus unsurpassed ability to remove metal quickly, accurately and smoothly, makes Lovejoy Type "A" mills outstanding for production economy.

The Type "A" blades are held in the housing with the famous Lovejoy "positive-locking" device. This means that a minimum of stock must be removed when sharpening. It allows utilization of a large per cent of each blade. It holds the blades immovably, even during heavy, intermittent cuts.

Type "A" face mills are available for all standard arbor and spindle mounts, and for either positive or negative rake cutting.

See these milling cutters and the rest of the complete, modern line of Lovejoy tools at the Machine Tool Show, Booth 153.

LOVEJOY TOOL COMPANY, INC.
SPRINGFIELD, VERMONT, U. S. A.

*Fluidmotion** Radius and Angle Dressers save time in ACCURATE FORM DRESSING

"FLUIDMOTION", an exclusive J & S development, automatically blends any combination of angles and arcs in **one** continuous motion, with **one** setting, using **one** handle. Produces clean, precise form without tool or chatter marks. Available in models C, E and F... also the Form Master, an accurate lower priced dresser. Send for folder.

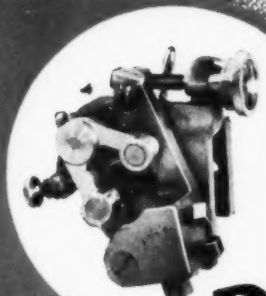
*REG. U. S. PAT. OFF.

Fluidmotion Features

- automatic centering
- .0001" accuracy
- one setting per form
- 14" wheel capacity
- large radius range
- dustproof
- chatterless



MICROMETER ADJUSTMENT
ELIMINATES "GUESS WORK"



Patent No.
2151374

Biltmore

- 1 Can be fitted to any Turret Lathe.
- 2 Requires only about 10 Seconds to "set" Cutter for each new cut.
- 3 Cutter will take sharper edge.
- 4 Cutter will last 60% longer.
- 5 Dial control also serves as "tool release" on backing off.

SINGLE CUTTER ADJUSTABLE TOOL HOLDER

A turn of the Adjustment Dial one graduation moves the Cutter exactly 1/1000th of an inch, and instantly locks in place. Speed and accuracy control maintained. The Cutter is nearly in a vertical position. The cutting edge is "with" the END GRAIN of the steel, therefore, your Cutter will take a sharper edge, and last 60% longer.

The Dial screw is on the fixed base plate. It actuates the cutter plate, which moves on a pivot.

Turn the dial clock-wise to set Cutter "in". Turn the dial counter-clock-wise on backing off.

Size B $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Immediately Available.

Dealers: Some territories still open.

*"Biltmore
Builds More
Production"*

HOUSE OF COMMERCE

905 HAMMOND BUILDING

DETROIT 26, MICHIGAN

★ 4 BIG REASONS WHY

the Standard COULTER "HT" Thread Milling Machine
IS THE MACHINE FOR YOU!

- ★ Any number of Lands eccentric or con-eccentric relief can be produced. Dies from $\frac{3}{8}$ " up to 2"
- ★ Equipped to give cutter speeds with infinite changes from 100 RPM to 650 RPM
- ★ Can thread round, square and inserted chaser dies
- ★ The most economical of ALL threading machines

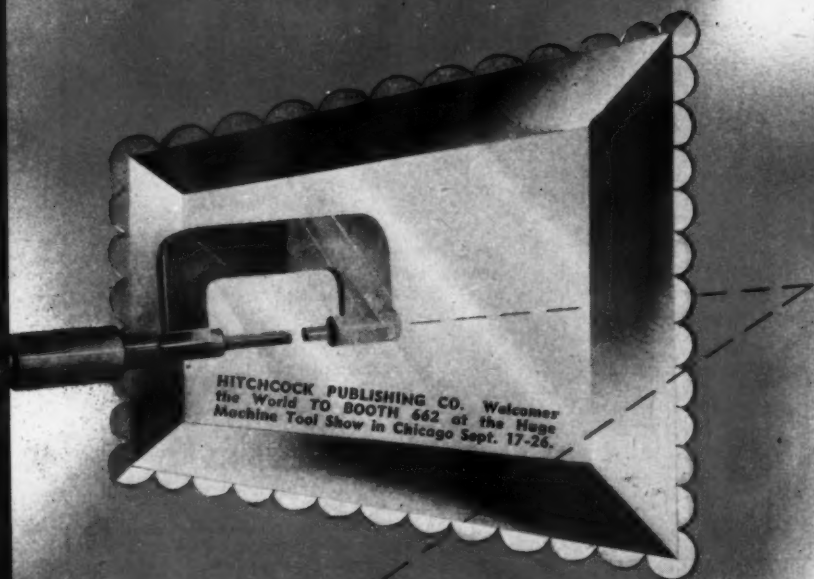
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Hitchcock industrial catalogs and magazines are pictures of American industry "know-how". Space bought in Hitchcock metalworking industrial publications produce results of immeasurable worth in goodwill, sales and long-life reference.

EXPORT CATALOGS: HITCHCOCK INDUSTRIAL REFERENCE, AVISADOR TECNICO, INDICE TECNICO—La MAQUINA—MACHINE and TOOL BLUE BOOK



Dust C.O.D. with Roto-Clone



THE Roto-Clone method of "collection on delivery" of your dust can be varied to meet your individual problems. For example, this battery of eight buffing and polishing jacks, shown at left, produces a fibrous, greasy dust which is a fire as well as health hazard. A Type N Roto-Clone, exhausting 10,000 C.F.M. solves the problem by wet collection of the material.



View above shows close-up of this Type N Roto-Clone Hydrostatic Precipitator. It's compact, occupying but 35 sq. ft. of floor space. Combining centrifugal forces and intimate inter-mixing of water and dust-laden air, this unit operates by the hydrostatic principle for high efficiency dust separation. Since there are no moving parts, there is no danger of fouling and no maintenance is required during operation.

The Type N is just one unit in a complete line of AAF Roto-Clone dust control equipment. Whether your dust problem calls for wet or dry collection, servicing an individual machine or a large central control system, there's a Roto-Clone of a type and size to meet your needs. Write today for Bulletin No. 270-A.

AMERICAN AIR FILTER COMPANY, INC.

312 CENTRAL AVE., LOUISVILLE 8, KY.

In Canada: Darling Bros. Ltd., Montreal, P. Q.

ROTO-CLONE DUST CONTROL EQUIPMENT

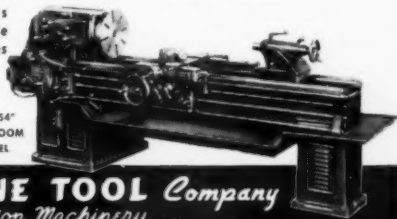
Accuracy a "must" on Sidney Lathes



● As it is impossible for everyone interested in lathes to visit our plant we are taking this means of bringing part of our factory to you. Here we show a few of the many accuracy tests to which the various parts are subjected before being assembled into operating units. This photo depicts the care and precision that is built into every Sidney lathe. With Sidney, accuracy is a "must". You can prove it by putting your precision jobs on a Sidney Lathe. Bulletins available on all sizes.

**Bulletins
available
on all sizes**

16" x 54"
TOOL ROOM
MODEL



The SIDNEY MACHINE TOOL Company

Builders of Precision Machinery

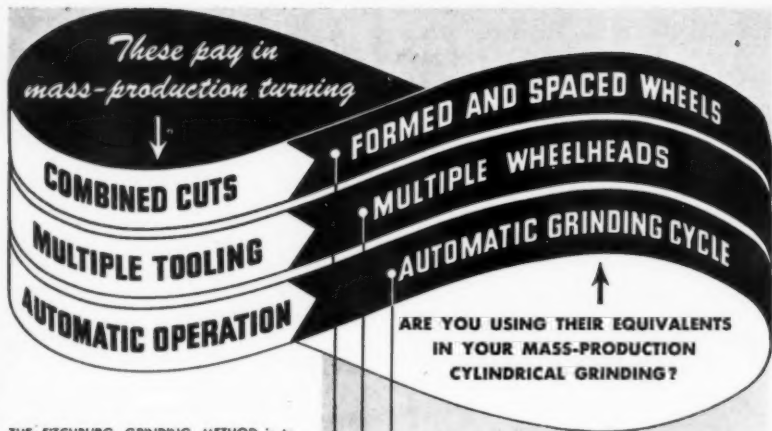
SIDNEY

ESTABLISHED 1904

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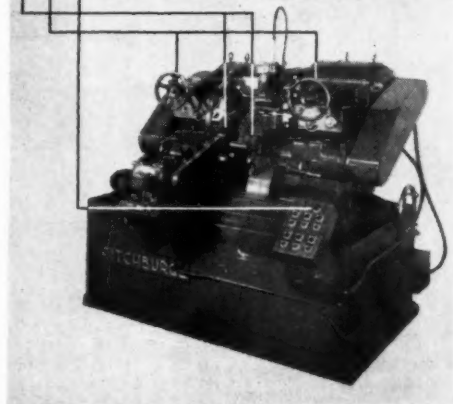


THE FITCHBURG GRINDING METHOD is to mass-production cylindrical grinding what combined cuts, multiple tooling, and automatic operation are to mass-production turning.

The completely automatic cycle Fitchburg Bowgage Wheelheads may carry a standard-width wheel, two or more spaced wheels, or a wide wheel for use in formed wheel grinding. Each of the Bowgage Wheelheads is a complete, independent, precision unit—with all movements and controls completely self-contained. The wheelheads may all be operated simultaneously or in sequence, as desired.

The operator of a Fitchburg Grinder simply loads the work-piece on the machine—pushes the "Start" button—and the machine takes over completely: grinding to the required size, and then stopping automatically for removal and reloading of the work.

Investigate Fitchburg Automatic Multiple Precision Grinding. You'll be surprised at the number of operations that can be done at one



setting, size held to tolerances previously not attempted—and all on a very high production basis. A letter, enclosing blueprints, will incur no obligation.



FITCHBURG GRINDING MACHINE CORP.

FITCHBURG, MASSACHUSETTS, U. S. A.

Manufacturers of—Bowgage Wheelhead Unit, Multiple Precision Grinding Unit, Spindle Grinders, Cylindrical Grinders, Gear Grinders, Rack Tool Universal Grinders and Special Purpose Grinders



The principle of the Acro Die Set Puller is to remove the punch holder from die shoe by a straight upward pull, whereby punch holder travels upward from die shoe axially, leaving both leader pins simultaneously. This can be accomplished only by use of the indented screw wrenches which act as indicators, controlling the upward travel. This is an exclusive patented by Acro feature, found only on Acro Die Set Pullers.



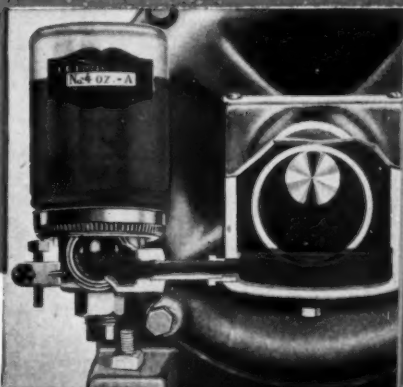
Order a set today. Convince yourself of the savings you can make in your tool room. ACRO PULLERS furnished in three sizes. Write now for more information.

Dual visibility — Sight glass on side of lubricator bowl an exclusive SUPER feature, shows exact oil level maintained in bearing plus oil supply in reservoir, eliminating guess work.

There is no drippage, no waste, no overflow. Oil is automatically fed to the bearings as required.

Nationally known authorities estimate that 75 per cent of all machinery repairs are caused by inefficient and improper lubrication, and that 85 per cent of the oil bought for lubricating purposes is never used by the bearing surface for which it was intended. WRITE FOR LITERATURE.

SUPER LUBRICATOR . . .



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PROMPT
DELIVERY

METAL STAMPING COMPANY: 332 E. RESERVOIR AVENUE
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**OVER 1200 YEARS OF EXPERIENCE
BUILT INTO HENDEY LATHES AND SHAPERS**



Men with a pride in their craftsmanship and a devotion to their work are bound to build better machines. The group above, gathered to honor their old associate, Mr. W. P. Norton, inventor of the Quick Change Gear Box, has a combined service record with Hendey that adds up to more than 1200 years. They draw unsparingly on this priceless experience in developing and building the constantly improving Hendey lathes and shapers. They are your assurance that machines built by Hendey will always meet the highest standards of accuracy and performance.

Particularly interesting is the lathe on Mr. Norton's left. It is the original machine on which the Quick Change Gear Box was installed. In 1892 this lathe won a Gold Medal at the Chicago Exposition. Today it is still going strong. The modern lathe just behind Mr. Ayr, President of Hendey, is a 1947 model Hendey Toolroom Lathe, functionally designed for the vastly advanced production needs of today. You'll see them together again in the Hendey booth at the Machine Tool Show.

The Hendey Machine Company

Main Office and Plant — Torrington, Connecticut

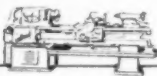
Offices — N. Y., Chicago, Boston, Detroit, Rochester, Los Angeles, San Francisco

Representatives in — Philadelphia, Cleveland, Pittsburgh

Hendey

TOOL ROOM LATHES

12" - 14" - 16" - 18" - 20"



SHAPERS

12" - 16" - 20"



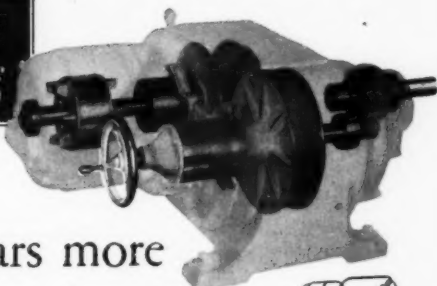
A Tip to the
very wise. Buy
VARIDRIVES

Now...

for a few dollars more

you can have *Varidrive*

instead of a fixed speed motor



When you select your next motor, pause for a moment and think of all the extra advantages variable speed will give to your machine.

It may surprise you to learn that you can now buy a *U. S. Varidrive Motor* for not too many dollars more than an ordinary motor will cost. But the savings it will return to you will pay and repay this small difference in cost for years to come in many ways.

A *Varidrive* does more than give you thousands of speeds. It gives you precise control that fits the operator's rhythm of movement. It will help synchronize production flow. Your machine will produce more because you can regulate its speed instantly to meet the varying conditions that arise day to day, hour to hour, minute to minute. You'll get more output from your shop labor—a better "frame of mind," less fatigue, complete satisfaction on his part,—because he will be operating with the best for the job.

The *U. S. Varidrive Motor* helps modernize your plant. It's the last word in motor power. It's compact, self-contained, occupies little more space than an ordinary motor—and it enables your present equipment to operate with more scope, at controlled tempo.

If you have never used a *U. S. Varidrive* you can't realize the uplifting effect it has upon the operator, as well as the increased versatility it gives to the driven machine. So try one. Put it through the paces. You'll be amazed at what it will accomplish. And bear in mind, its initial cost is little more than just a motor. You can't afford to operate without it.

Speed ranges up to 7 to 1. H.P. $\frac{1}{4}$ to 15.

Built-in gearing available for lower speeds.

Ask for Bulletin F-836

U.S. ELECTRICAL MOTORS, Inc.

Atlantic Plant:
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Pittsburgh 22; Chicago 8;
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QUALITY
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IMMEDIATE DELIVERY

Complete stocks maintained at all times by exclusive distributors throughout the U.S. and Canada.

Precision made from finest oil hardened tool steel—ASA Standard—with concentric ground lead to insure perfect alignment.

FREE DELIVERY ANYWHERE IN THE U.S.A. OR CANADA

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SPECIALIZING ONLY IN DRILL BUSHINGS



Saves Time Consuming Trips to the Tool Crib

NECESSARY BORING TOOLS

Instantly Available

IN NEW DAVIS BAR SETS




Sets Include Super Micrometer Boring Tools, Offset Boring Head and Setup Accessories

This new Davis set of super micrometer boring tools ends the time lost in selecting and obtaining from the tool crib the right fly cutter for precision boring operations. A Davis set of tools placed near the machine simplifies tool handling. The convenience of having several stub boring bars, an offset boring and facing head, sleeve adaptors and setup accessories in a convenient box cuts floor-to-floor time on many parts. With this set of tools, boring cuts can be made progressively using the different sized bars.

DAVIS SUPER MICROMETER STUB BORING SETS are designed to handle a wide range of boring and facing operations. They may be used on all type machines because bars and accessories in Set Nos. 10 to 15 may be modified to meet individual machine and boring bar needs.

A check of your own boring requirements will suggest ways in which a set of Davis Super Micrometer Fly Cutters can be profitably used. Select the set for your needs now.



DETAILS ABOUT DAVIS MICROMETER ADJUSTED CUTTER SETS AND OFFSET BORING AND FACING HEADS

Set No. 11 Comes Complete with...

Bar No.	Bore Size In.	Bar Dia. In.	Cutter Size In.	Bar Leth. In.	Morse Taper
123	1 1/4 - 1 1/2	1	1/4	4 1/2	4
121	1 1/2 - 2	1 1/4	5/8	5 1/2	4
118	2 - 2 1/2	1 3/4	3/4	7 1/2	5
116	2 1/2 - 3 1/4	2 1/4	1 1/4	9 1/2	5 ex.
114	3 1/4 - 4 1/2	2 3/4	5/8	11 1/2	6 ex.
111	4 1/2 - 5 1/4	3 1/2	3/4	11 1/2	6 ex.
107	5 1/4 - 7	4 1/2	1	5 1/2	6 ex.
15	OFFSET BORING & FACING HEAD Range 0 to 13" Feed Grad. .005" Max. Adjust 3/4"				

- 1—Each No. 4 and 5 hardened and ground taper adaptor sleeve.
- 1—Star wheel and trip for boring and facing head.
- 5—Boring tools and suitable wrenches for offset head.
- 4—Adjustable stop blocks.
- 4—Hardened and ground stop and jack blocks.
- 2—Extra H.S.S. cutters with each bar.
- 4—1 3/4" x 3/4" x 8" hardened and ground parallel blocks.
- 1—Long life protective retaining case.

DAVIS BORING TOOL DIVISION OF
GIDDINGS & LEWIS MACHINE TOOL COMPANY
 144 DOTY STREET • FOND DU LAC, WISCONSIN

THE CONE AUTOMATIC MACHINE COMPANY



sees many

GOOD THINGS AHEAD

It is reported that

White Sewing Machine Co. stores its lumber on wheels, thus reducing the number of handlings from six to one.

get ready with CONE for tomorrow

Chesapeake and Ohio is planning to buy a thousand freight cars equipped with roller bearings.

be ready with CONE for today

Commonwealth Edison Co. has a "cyclone" burner in its Calumet Station that removes 80% of the coal ash as molten slag in the burner.

get ready with CONE for tomorrow

Britain's Southern Railroad is laying track in complete prefabricated 60-foot sections.

be ready with CONE for today

Caterpillar Tractor Co. is using electronic rectifiers in place of motor-generator sets to convert AC current to DC for the operation of machine tools.

get ready with CONE for tomorrow

Manuel Gonzales, a Civil Engineer of Mexico City, builds multiple story, poured concrete buildings by laying the top floor first and suspending the forms for each floor from the one above.

be ready with CONE for today

Timken-Detroit saves 400 pounds in the weight of its new heavy-duty tandem truck axle by using aluminum in housing, hubs and brake shoes.

get ready with CONE for tomorrow

DuPont is building a plant at Niagara Falls to make fufuruf from farm waste. The fufuruf will be made into Nylon.

be ready with CONE for today

American Optical Company has a new glass which absorbs 90% of yellow light and which is expected to be useful in goggles for workmen fusing glass in a sodium flame.

get ready with CONE for tomorrow

Simonds Saw & Steel Co. has a new dial indicator that registers the tension on a hack saw blade.

Electronic heating equipment made by Induction Heating Corp. reduces to seconds the time required to bake foundry sand cores.

be ready with CONE for today

A radiation counter that operates over a wider range than the familiar Geiger counter has been developed by Westinghouse.

get ready with CONE for tomorrow

Verdi Bros. of Jersey City are bringing the old-fashioned oak beer keg up to date by making it of nine-ply laminated wood.

be ready with CONE for today

The Arman Co., of Middletown, Ohio, has designed a miniature cold strip mill for Westinghouse to roll their new magnetic alloy "Hipercro" as thin as .002 in.

A method of electroplating, in which the current is periodically reversed, has been developed by Westinghouse. The deposited film is said to be more dense and so smooth as to require no polishing.

get ready with CONE for tomorrow

Detroit Diesel Engine Div. of General Motors is in production on a new hydraulically operated transmission for their engines.

be ready with CONE for today

Pezzillo Pump Co. is making an electric pump that can be installed directly in a pipe line like any other fitting. The impeller and rotor are integral and the liquid flows through the motor.

get ready with CONE for tomorrow

A possible answer to the need for heat and stress resistant material for gas turbines, jets and rockets is a new crystalline porcelain announced by the U. S. Bureau of Standards.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

CHICAGO SHOW

CONOMATIC REVIEW

This page, September issue, will feature

NEW MODELS

innovations — improvements

• CONE

AUTOMATIC MACHINE CO., INC. • WINDSOR, VERMONT, U.S.A.



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EVERYWHERE ARE *Invited*
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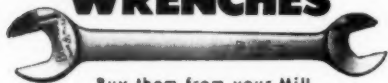
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EXHIBITORS... PHONE OR WIRE
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GRAFTON, WISCONSIN



the
name
to
know
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wrenches

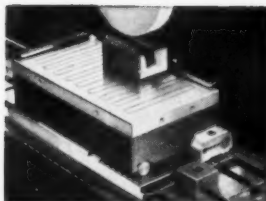
BILLINGS

WRENCHES

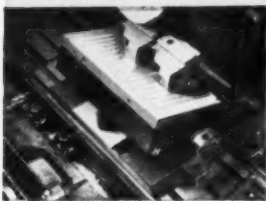


Buy them from your Mill
Supply or Hardware Dealer

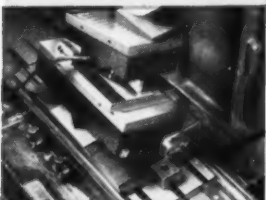
THE BILLINGS & SPENCER CO.,  HARTFORD 1, CONNECTICUT, U. S. A.



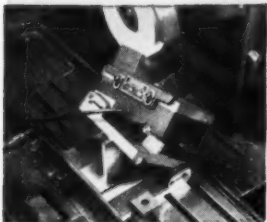
Grinding straight work



Grinding angular work



Used in combination with a smaller model Magna-Sine for compound angular grinding. Also units for straight, single and compound angles—see illustration below.



A *Versatile* MAGNETIC CHUCK FOR SURFACE GRINDERS

The MAGNA-SINE

Many shops have standardized on the Magna-Sine for all surface grinders. In closed position, it functions as a conventional magnetic chuck, and when an angular job comes along, the Magna-Sine is right on the spot for a quick set-up. Magna-Sines quickly pay for themselves in time savings from just a few angular set-ups. And Magna-Sine set-ups are more dependable. The Magna-Sine, set up with standard gage blocks by the sine bar method, assures positive accuracy.

Send for new catalog which gives full details on the Magna-Sine.

LEFT: The compound angle Magna-Sine. Compound angle units may be used for straight, single angle or compound angle work.

Robbins Engineering Co., 318
Midland Ave., Detroit 3, Mich.

 *Robbins*
ENGINEERING COMPANY

PRODUCERS OF ROBBINS MAGNA-SINE • ROBBINS UNIV-ANGLE
ROBBINS SINE PLATE • ROBBINS INDEX TABLES
ROBBINS No. 3 DRILLMATIC • SPECIAL MACHINERY

cut production costs with a **SHOPLIFTER**

- Light, Compact
- Easily Moved About
- One-Man Operated
- Wide Range in Application
- Saves Production Time

In handling dies and heavy fixtures; stacking barrels, boxes, etc.; loading and unloading trucks

Specifications

Type—D

Capacity—500 lbs.

Overall height—72"

Platform lift—54" above floor level, lowers to within 5" of floor

Baseframe—24" wide x 33" long

Platform—24" x 24", steel plate

Entire frame of machine of structural steel, electrically arc welded throughout

Basewheels—4" diameter, iron wheels

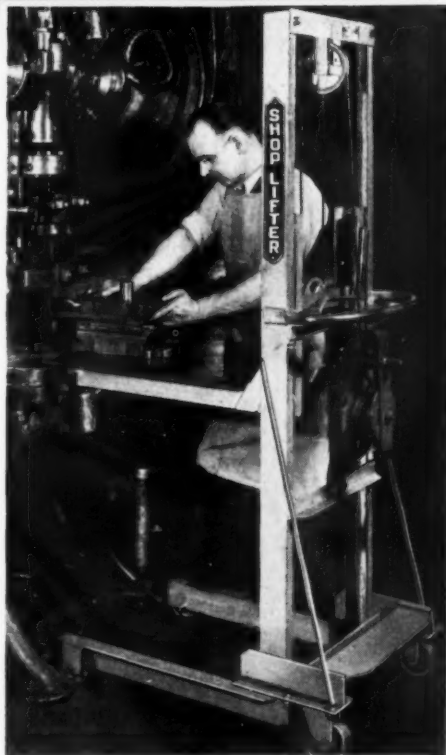
Crank up and down hoist unit

Two swivel casters and two stationary wheels with push bar furnished

Painted olive green finish

Weight—250 lbs. (approx.)

Heavier capacities up to 5,000 lbs. also available. Write for details.



Prompt Delivery

Price \$157.50. Full Freight Allowed ... Foot Operated Floor Lock, \$10.00 Extra

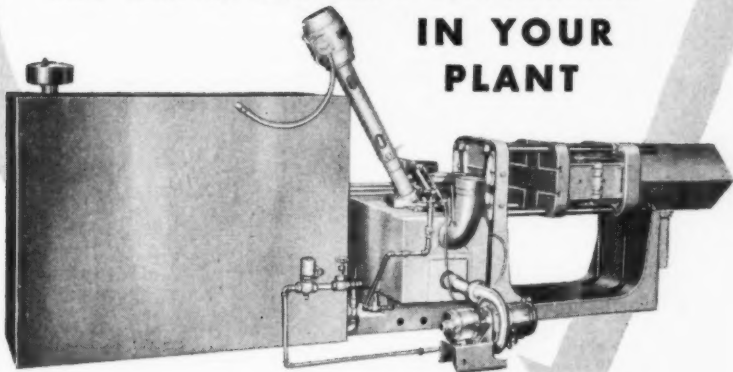
2635 West Van Buren Street, Chicago 12, Illinois

ECONOMY ENGINEERING CO.

NEW

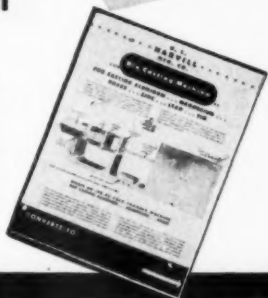
HARVILL DIE CASTING MACHINES

**CUT COSTS, INCREASE PRODUCTION
IN YOUR
PLANT**



**Write for case histories and full
cost cutting facts today!**

Hundreds of Harvill machines are in use today . . . saving money and speeding production. There is a size and type for every use . . . to cast zinc, tin, lead, aluminum, magnesium and brass alloys. Write on company letterhead for full facts!



H. L. ^{RED} HARVILL MFG. CO.
CORONA, CALIFORNIA

FOR INSTALLATION in small space

**RUTHMAN
GUSHER**

COOLANT PUMP
ON A

**KENT-OWENS
2-20 Hydraulic
Milling Machine**

Here is a graphic illustration of the small space required for the installation of a Ruthman Gusher Coolant Pump. This P-3 1/10 Short Ruthman Gusher Pump requires no outside piping other than the hose and nozzle leading to the cutter. Both intake and delivery passages are self-contained. Full freedom of movement is assured for the operation of the metal working machine.

Ruthman Gusher Coolant Pumps are manufactured in a variety of types and sizes, outside pipe connected, immersed, flange mounted with internal discharge, flange mounted with external discharge with motor capacity from 1/10 to 2 HP.

Whatever your needs, there is a Ruthman Gusher Coolant Pump to fit it.

WRITE FOR CATALOG 10-G.

THE RUTHMAN MACHINERY CO.

1816 READING ROAD

CINCINNATI 2, OHIO

*Photos Courtesy
Kent-Owens Machine Co.
Toledo, Ohio*



Van Keuren

PRECISION CHROMIUM PLATING

applied to Plug Gages

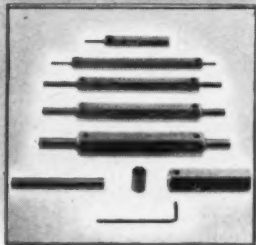


THE Van Keuren Co. has developed a new method of precision chromium plating of wire type and taper insert plug gages. In this modern plant we have combined the best available plating practice with the ability to make precision measurements. We are able to deposit a chromium wear surface accurate to a few millionths of an inch. Gages are finished to the low wear limit and then are plated to the high wear limit. The result is a thin, closely adhering wear surface which will not crack or peel and which is available at a very moderate cost.

Instead of paying 50 to 75% additional for chromium-plated gages, they are now available for only 25% additional and they wear 3 to 5 times as long as steel gages. The many repeat orders which we are getting from large users indicate that this new method is resulting in more prompt deliveries, greater wear, lower gage cost, and satisfied customers. For your next gaging job, specify Van Keuren chrome-plated gages.



Handbook and Catalog No. 33.



THE

Van Keuren

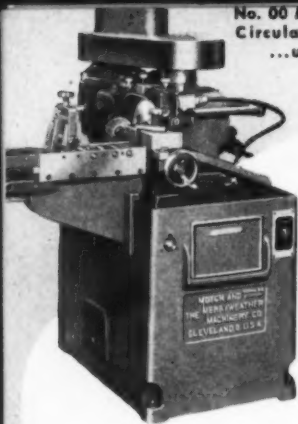
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...up to 2"



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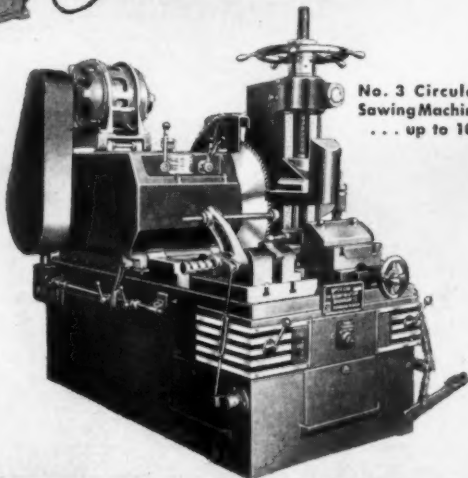
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Sawing Machine
...up to 6"



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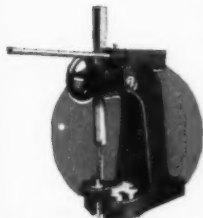
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SAW BLADE
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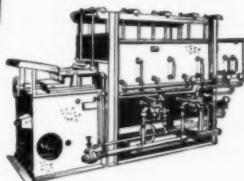
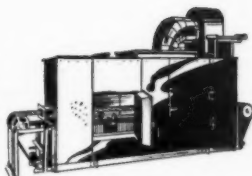
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August, 1947

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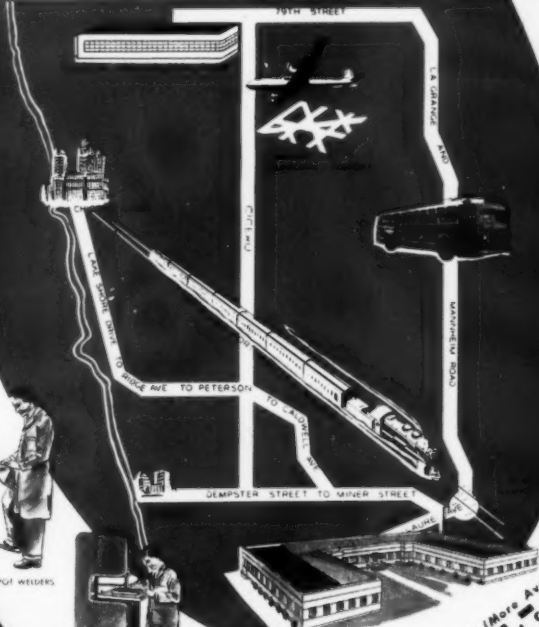
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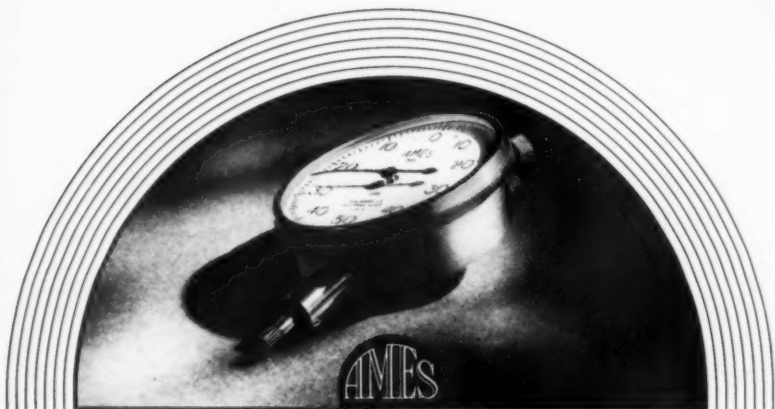


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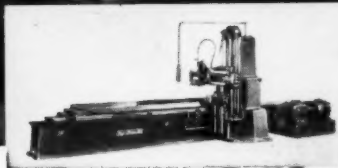
Burnished Hardened Bearings



SMOOTH... a typical Shaper-Planer job. press gibs, machined to a smooth finish. Machined on all sides with broad nosed tool... 45° V-way cut with solid formed tool.



PRECISION FLAT... unusual Shaper-Planer job, proof of a smooth flow of Hy-Draulic power drive. Copper core for resistance welder is planed to precision flat surface.



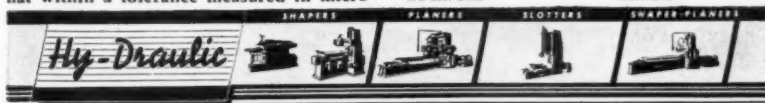
smooth to precision flat

Unusual accuracy of the Rockford Hy-Draulic Shaper-Planer is demonstrated by the above installation. Machining the gibs to a smooth finish is a standard job, typical of the hundreds of small planer jobs that are easily and quickly done on a Shaper-Planer. But machining the copper core of a resistance welder is a most unusual job... and proof of the absolute smoothness of the Hy-Draulic cutting stroke. The finish obtained on this work with the Rockford Hy-Draulic Shaper-Planer was a surface that checked precision flat within a tolerance measured in micro-

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ROCKFORD ILLINOIS

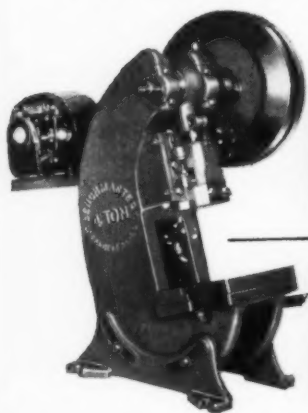


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For full information about this new Benchmaster Punch Press and other quality Benchmaster machine tools, write to Dept. MT-8

SPECIFICATIONS:

Weight, 215 lbs.
Height, 27"
Die space, 5 $\frac{1}{4}$ "
Center of bolster plate
to frame, 3 $\frac{3}{8}$ "
Bolster plate, 6" x 8" x 1"
with 2" hole in center
285 strokes per minute with
1725 R.P.M. electric motor
1" stroke standard
Other strokes up to 2"
special

benchmaster

MANUFACTURING COMPANY
2952 WEST PICO BOULEVARD
LOS ANGELES 6, CALIFORNIA





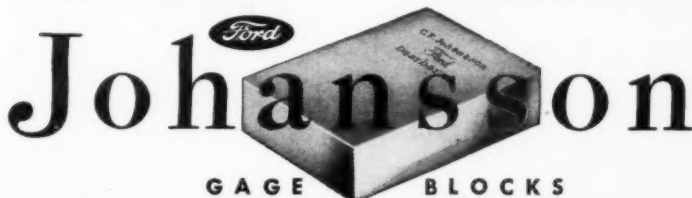
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When you set up dimensional inspection tolerances, it's to insure a specified class of fit in assembly, or to make sure of parts-interchangeability, or for some other good reason. The harder it is for an inspector to be *sure* he's staying within limits, *the more it costs*.

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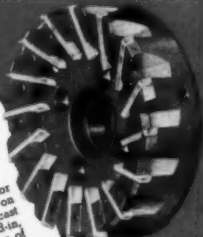
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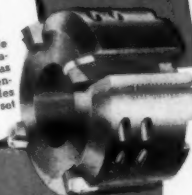
For use on reasonably modern milling machines. Has wedged-in, advanceable blades of solid Kennametal. Adaptable for milling different materials by interchanging blades.



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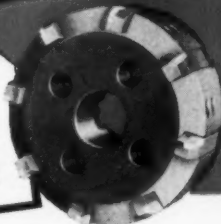
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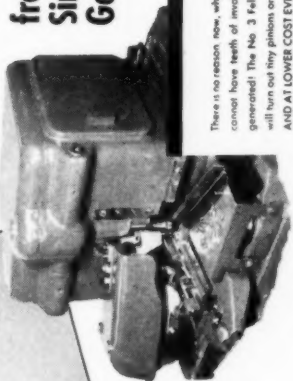
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MILLING VISE



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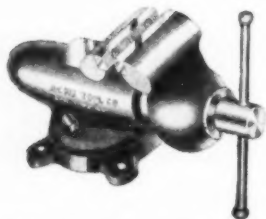


NEW Mohawk "lifetime" counterbore with blades that can be sharpened without waste for its entire length and integral, sub-land, precision, radial-ground pilot extending the entire length of the flute. Just sharpen the end of the blades-the pre-ground sub-land grows a new pilot for you. You never have to cut off useful tool life to re-establish a pilot. Write for sizes and prices on stock numbers to Mohawk Tool Company, 21647 Dequindre Road, Hazel Park, Michigan.

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PRACTICALLY INDESTRUCTIBLE—Head and Nut are Malleable Castings; others parts are semi-steel castings of high tensile strength.

SIDE TWIST PREVENTED by Precision guided steel key at base of the main body.

SPINDLE fitted into a horizontal sleeve nut—permits even, central pull—eliminates dead motion.

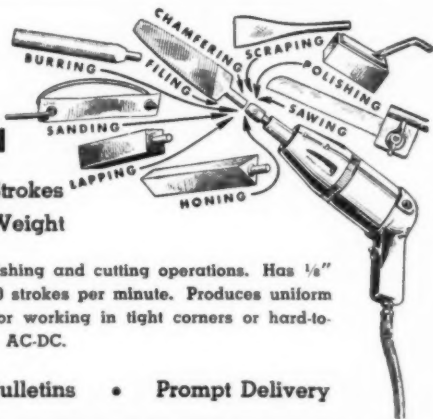
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A compact tool used for roughing, finishing and cutting operations. Has $\frac{1}{8}$ " or $\frac{3}{16}$ " long fixed stroke. Delivers 1000 strokes per minute. Produces uniform work with high precision. Excellent for working in tight corners or hard-to-reach places. Operates on 110 volts, AC-DC.



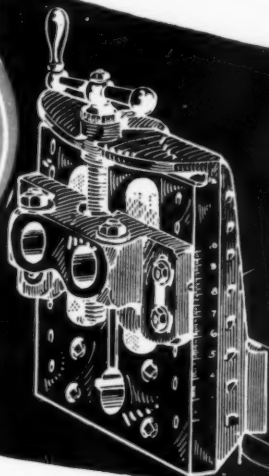
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ACME TOOL COMPANY

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This holder is especially designed and adapted for use with models 4D and 4DE machines only. There are many other Potter & Johnston tools that would be helpful in cutting production costs to meet post-war competition.

STANDARD ADJUSTABLE TURNING TOOL HOLDER

This adjustable tool holder will carry two Stems, either for turning or boring cuts, and in addition, a boring bar or drill may be carried in the center hole. The cutters are quickly set to the required diameters by moving the adjustable block up or down. The side scale and the micrometer dial under the ball crank contribute to quick and accurate settings which may be changed easily with the job. Two locking screws on either side of the block fix it solidly in the location desired. The adjustment range of the Stem holes is from 4 to 10" from the rotation center.

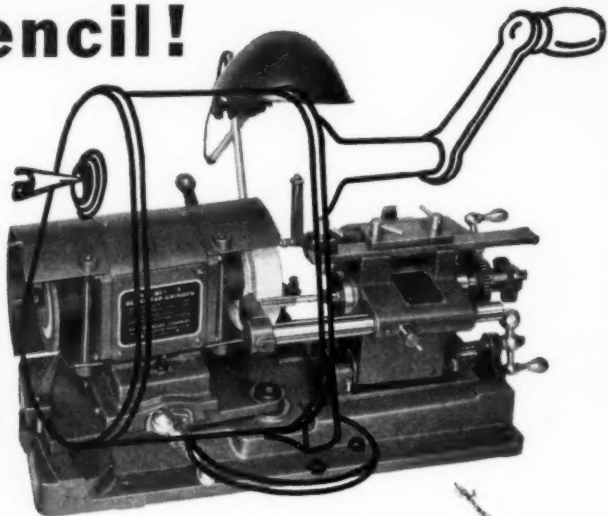
If you use Potter & Johnston machines in your plant, it will pay you to let us send you a copy of this catalog on modern tooling. It illustrates and describes a broad range of up-to-the-minute production tools.



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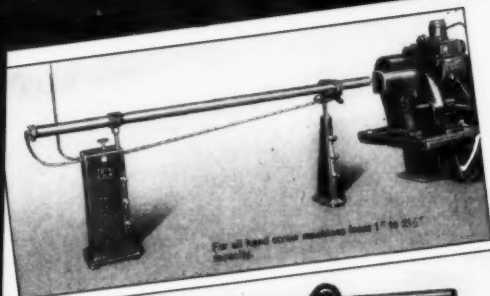
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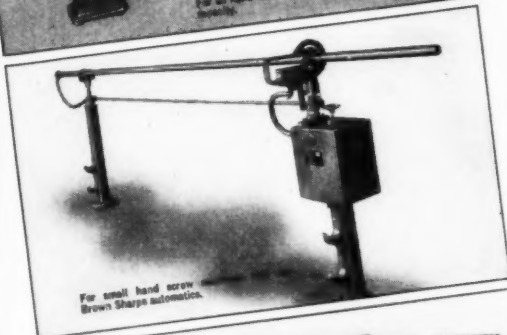
BLAKE TAP GRINDERS—FILTAIRE PORTABLE DUST COLLECTORS—AMERICAN TOOL HOLDERS—BLACK
DIAMOND PRECISION DRILL GRINDERS—WALTHAM CUTTER SHARPENERS

IN ONE FEED-OUT

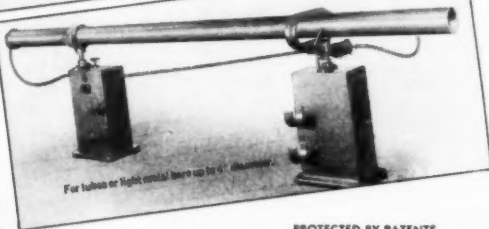
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Welded Steel Cuts Cost of Base 45%

By W. E. Benninghoff, General Manager
TOCCO Division
The Ohio Crankshaft Company, Cleveland, Ohio

BY thinking in terms of welded design for the fabrication of parts and assemblies of TOCCO Induction Heating Equipment, we have been able to benefit in two important ways.

1 Day after day, we use welded design in the development of work-handling fixtures and accessories for standard TOCCO machines and in the designing of special TOCCO machines. Each must be built to match a specific application. Welding permits us to use greater ingenuity and freedom in the design of this equipment and to manufacture quicker, at lower cost.

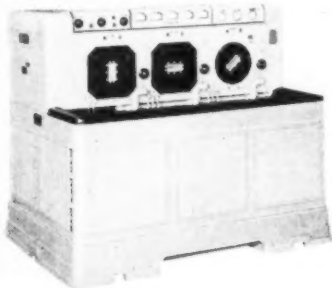


Fig. 1. Completed TOCCO Induction Heating Machine with former base.

2. In the manufacture of our standard TOCCO machines of all sizes and types, we use welded design for many parts to provide maximum rigidity and strength, lighter weight and lower cost. It also enables us to continually improve these parts because we are not restricted by patterns. The cabinet frame of the 150 KW TOCCO unit shown in Fig. 1 is an example of the larger welded steel parts which we have used for some time.

Recently we have also changed the base of the machine shown in Fig. 1 from cast iron to welded steel. The cast iron base weighed 3175 lbs. compared to 1180 lbs. for the welded steel base shown in Fig. 2. It was necessary to machine the top of the cast base to secure level mounting for the motor generator set. The welded base is

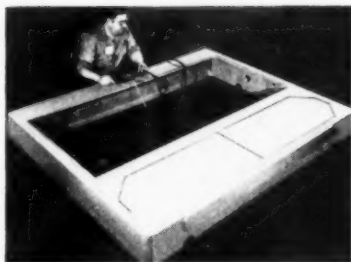


Fig. 2. The new welded steel base for 150 KW machine shown in Fig. 1.

ufficiently level as fabricated and requires no machining, thus providing further saving.

The total net cost saving with the welded steel base is 45%.

The base of this TOCCO machine supports a 150 KW high-frequency motor-generator, transformers, electrical controls and other equipment, housed in a steel cabinet. The total weight of the machine, including the base, is about 12,000 lbs. In service, it must be permanently level, rigid and have good vibration-dampening qualities.

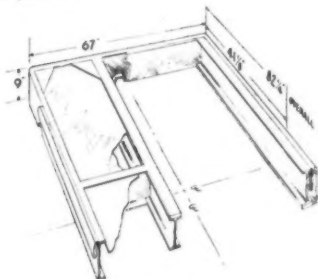


Fig. 3. Schematic drawing of fabricated base.

The construction of the welded steel base is shown in Fig. 3. Made of standard mill shapes and plate, it requires a minimum amount of welding, resulting in close control of tolerances and minimum cost. It is proving highly satisfactory in performance in every respect.

*The above is published by LINCOLN ELECTRIC in the interests of Progress.
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Featured in ... this issue ...

DESIGNING AND USING DRILL JIGS, by C. W. Hinman. The MACHINE and TOOL BLUE BOOK is happy to present material by this noted Design Engineer. Mr. Hinman is author of several works on drill jigs, presses and other metalworking equipment and methods. In this first of several articles the principal types of drill jigs are discussed. Page.....137

INCREASED PRODUCTION BY THE USE OF SPEED LATHES, by S. E. Wright. By using speed lathes on secondary finishing operations many gains in production can be made. The author describes some interesting savings achieved through the application of speed lathes. Page.....147

THREAD GRINDING WITH A CENTERLESS THREAD GRINDER, by M. S. Ghesdahl. After heat treating, 15,000 to 20,000 finished screws can be obtained in one day with the use of the Landis Centerless Thread grinder. Cost reductions, simplified inspection procedures and lowered rejection rates are reported by the author. Page.....155

DEVELOPMENTS AND APPLICATION OF METAL SPRAYING, by Howard Batsford. Metallizing lends itself admirably to many money and time saving applications. The author lists a number of highly interesting case histories. Some of the fundamentals of metal spraying are discussed. Page.....168

USING CARBIDES IN METALWORKING, by H. A. Frommelt. The use of carbides with low horse power milling machines is this month's subject. Also included in this article is an analysis of milling cast iron on a 3 h.p. machine. Page181

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PRECISION MEASUREMENT, Warren Baker. In part 13, measurement of threads and gears is discussed. Standard thread nomenclature is given. Page207

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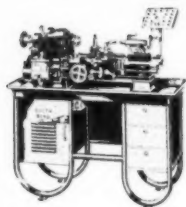
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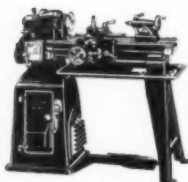
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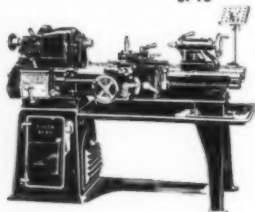
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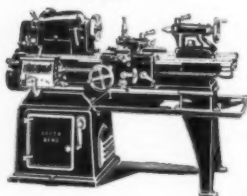
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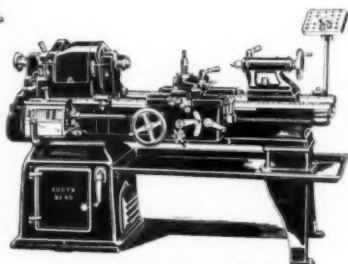
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As the **editor** *... ..* **SEES IT**

A DOWN TO EARTH EDUCATIONAL PROGRAM FOR ENGINEERS

Today's engineer is requested to address conventions, sales meetings and clubs in non-technical language. He travels with salesmen, braving the bitter wind of merchandising; he bandies words with the technical press.

Today's engineer must write in straightforward English. Reports, bulletins, publicity material and papers are sweated out in collaboration with advertising and publicity counsels. He is selected to prepare trade paper articles, thus launching a new product, describing a phase of research or analyzing a production technique.

The conference table is not immune to the engineer's intelligence. He is invited to participate in such non-technical discussions as labor management, public and community relations. His awareness of the interrelation between production prices, wages, sales and competition must be active and intelligent.

Yes, indeed, the modern engineer is more than an engineer. To the spicy mixture of formulae and technical tables is added the heady wine of pen and word and counsel. Unfortunately, too many engineers speak haltingly, write hesitantly and opinionate in silence. It is quite natural that this should be so. He was trained to be an engineer, not a lecturer, writer or counsellor. He knows his craft and discharges his duties with imagination, intelligence and skill; America's technical growth in the

last 50 years is vociferous evidence.

Because some of our schools are negligent in teaching down-to-earth non-engineering subjects, the engineer is left to his own devices to pick up, as best he may, the fundamentals of writing, speaking, selling and counselling. Assuming the engineer to be anxious to improve himself, a suggestion is advanced which might help the engineer to more efficiently discharge his newly-acquired duties.

Why don't the various engineering societies, working nationally through local chapters organize classes or lecture courses at which practical writing, speaking, selling, publicity and advertising are expounded in terms of the engineer's participation? When sponsored by engineering societies an educational program need not have a commercial aspect. Editors, salesmen, advertising men, publicists and others could be recruited to lecture and instruct.

All lectures would be practical, being presented by men conversant with the engineer's problems. Ideas discussed would be of immediate value. Here will be no dry-as-dust theories, abstract discussions and tortuous principles; instead, hard hitting facts.

Conference halls of local chapters, meeting rooms of some of the larger manufacturers could be enlisted. The cost of such a program would be slight; the value to engineers immense.

William F. Schleicher

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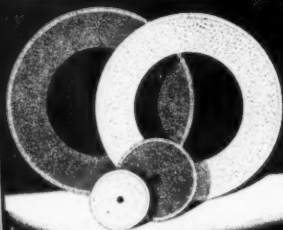
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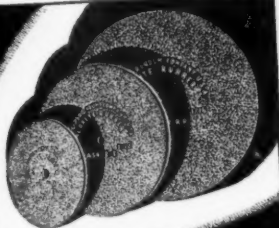


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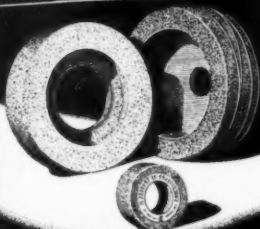
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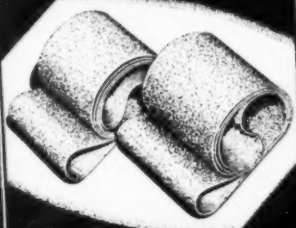
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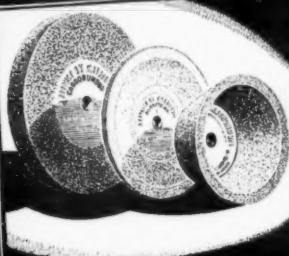
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IN a series of independent, exclusive articles, which will appear from time to time in the BLUE BOOK, Mr. Hinmann will present various aspects of drill jigs and their application.



Designing and using drill jigs

by
C. W. Hinman*
Designing Engineer

The eight following types of commonly used drill jigs may be considered as standard designs.

1. Plate, for drilling flat thin work.
2. Channel, for drilling flat thick work and holes in the side edges. A fastening under the work may be necessary for accurate side drilling.
3. Channel-and-leaf, for drilling flat thick work, or irregular shapes, on one or more sides, including angular holes. A key or other clamping devices may be substituted for a leaf.
4. Box, for drilling flat or irregular work shapes. A clamp under the work is sometimes necessary.
5. Box-and-leaf, for drilling flat or irregular work shapes on one or more

*Mr. Hinman is author of the book, "Practical Designs for Drilling, Milling, and Tapping Tools," published by the McGraw-Hill Book Company, Inc.

sides, including angular holes. Other clamping devices may be substituted for a leaf.

6. Angular-stand, for high speed drilling of one or a few holes.

7. Cylindrical, for drilling holes in the sides of round, near round, or tubular work.

8. Recessed jigs, these include a V-block, or block with a hole in which work is inserted for drilling. These jigs are also used for drilling irregularly shaped workpieces secured with screws.

Jig bodies can be machined from one solid piece of steel or cast iron. They can also be forged steel, or cast in one piece and their working surfaces finished on a shaper, grinder, or milling machine. An alternative method, except for the plate type, is to build-up the jig body by using suitable steel plates assembled with screws and dowel pins, or arc-welded together to complete the body design. There are several extraordinary jig designs, both large and small, that are made either from one piece of steel, a cast-iron casting, or built-up as just explained; an example of these are "pump-jigs."

Non-precision work parts are sometimes drilled without using a jig or guide bushing for the drills. This type uses a simple holding fixture, to secure the work in position while drilling the holes with short stubby drills. At times, a few pieces of work can be drilled on a jig-boring machine, but that is a slow operation. Recently, a new method for locating and drilling holes has threatened to supersede several types of commonly used jigs, but this idea has not been in use long enough to determine its value definitely.

Each of the classes of jigs named above, as well as the methods for drilling without jigs, are used for some specific purpose. It is our plan to show, in these articles, the different drill jig designs and the various purposes, and to present the necessary drafting technique as used by modern tool engineers.

A practical example for each of the eight standard designs of jigs and drilling methods, will be illustrated and described. Drill jig accessories, such as cradles for drilling angular holes, and ejector pin plates, will be shown in cases where they are necessary.

Plate Drill Jigs

Figure 1 shows a typical design of a small plate drill jig in which two knurled headed screws clamp the work piece against the stop-pins for drilling four holes. Plate jigs are used for drilling both metallic and non-metallic sheet materials. They are especially adapted for drilling plastics, Presdwood, Micarta plate, fiber, wood and hard rubber.

Bushing plate **A** and clearance plate **B** are of cold-rolled steel; the thickness of plate **A** is the same as the lengths of drill bushings **C**. Three flat-faced shouldered stop-pins **D**, with their flats against the work, are press fits in the bushing plate, and easy clearing fits in corresponding holes through clearance plate **B**. The stop-pins are of drill rod and hardened. Their faces are ground to line them and to provide the 90 deg. faces against which the rectangular work piece is clamped. When the faces of the pins become worn, which would cause erroneous drilling, they are removed and turned 180 deg. then reinserted and new faces ground.

The $\frac{3}{8}$ " extension on lower plate **B** provides a shelf for securing the jig on the drill press table, or to facilitate separating the plates for removing the work and to insert another piece. For holes which are drilled through the work, plate **B** is provided with clearance holes **E**, coincident with the bushing holes. The diameters of clearance holes in all drill jigs are 10 per cent larger than the drill diameters; the clearance holes cut off most of the drill burrs which accumulate when the drills break through the work.

Plate drill jigs appear very simple,

but in some larger ones the designer may be confronted with many difficulties. A large plate jig may have a hundred or more drill bushings which are used to drill holes on both sides of the work, or in different pieces of work. Many of the bushings may be for drilling "blind holes," while others are for "through holes." It is therefore necessary to cover the bushings not wanted on either side of a plate jig, and to expose those to be drilled. This can be done by attaching thin steel templates on the bushing plate; the templates have openings for exposing the desired holes while covering the others. It may be necessary to design several different templates.

Another problem is to determine correct gaging points on the work. Whether to extend the stop-pins through the bushing plate and "bellmouth" certain bushings for drilling from opposite sides of the plate, or to reverse the work and

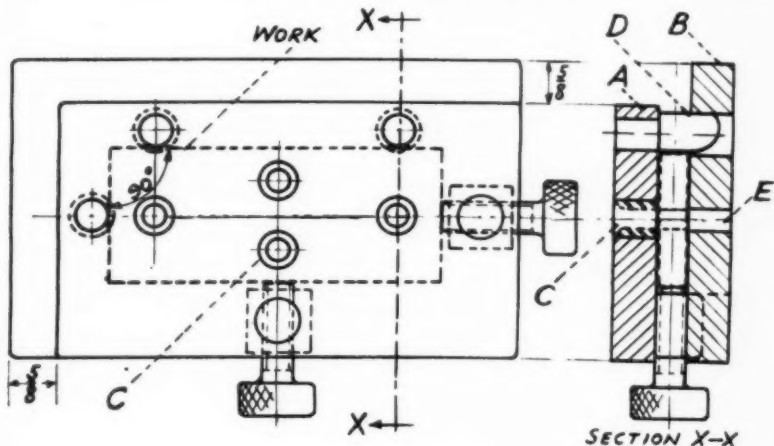
gage from the same stop-pins used in the first operation, and then take the risk of having faulty locations of holes by gaging from opposite edges. What to do depends upon the specified accuracy of the hole locations and the size of the order. It may be necessary to make a separate jig to "pin-in" at previously drilled holes in order to produce work that will pass inspection.

Channel Drill Jigs

Channel jigs are used for the high-speed drilling of small special orders. The one shown in Fig. 2 is machined from a solid piece of machinery steel. These jigs are easy to make and therefore low in price, but are efficient in use, and can be handled rapidly. The depth of channel is the same as the work thickness. There are ten drill bushings, and six of them are shouldered. Shouldered bushings eliminate the tendency to spot-drill useless holes

. . .

Fig. 1. Draftsman's sketch of a small plate drill jig for drilling four holes.



around them. This happens when the operator carelessly misses entering the drills. For long runs, jig bodies can be casehardened, which increases wearing qualities, and prolongs the life of the tool greatly. Notice the 30 deg. angular relief cut in one corner of the jig channel. This angle clears the sharp corner on the work and also prevents accumulation of chips. The angle can be cleaned, after drilling, by a blast of compressed air.

For drilling the four side holes, the jig is turned up on its edges. Parallel blocks are used, one each side of the knurled screw; the blocks clear the screw head and support the jig on the drilling machine table. If the workpiece is several times longer than the one shown, the channel is made deeper so that a hinged leaf or flat keys may be inserted to secure the work positively for drilling the side holes accurately.

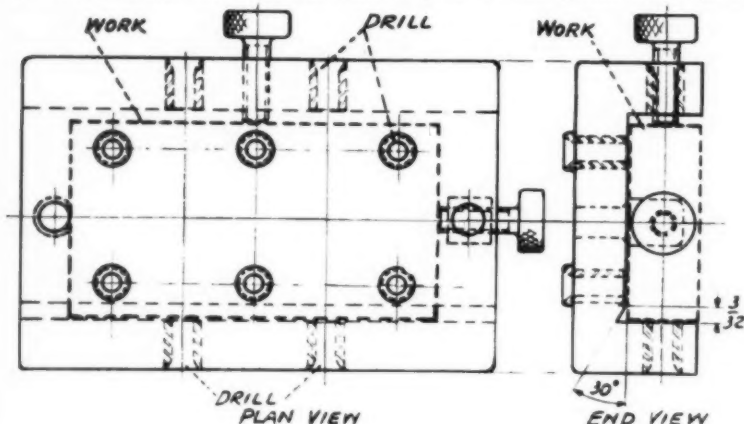
Channel-and-Leaf Jigs

Figure 3 illustrates an improved de-

sign for the commonly used channel-and-leaf jig. This type of drill jig is more frequently used in light manufacturing than any other kind. In the many large and small drilling departments throughout the United States and Canada, these jigs are used by the hundreds of thousands.

The jig body shown here is machined from a solid block of machinery steel, although it could be "built-up" from three properly shaped plates of cold-rolled steel, and the parts assembled by arc-welding. This particular design is much better than commonly used channel-and-leaf jigs. Two reinforcing ribs are milled parallel on the top surface of the jig body edges, and throughout its entire length. This idea is an improvement over the former method in which the ribs were located in similar positions below the jig floor; a design that formed a channel on the work side and made the jig difficult to keep clean. In the design shown, the jig floor is free and open for clearing it of chips and oil. The ribs also provide a means for load-

Fig. 2. Channel jigs are low priced tools designed for drilling rush orders quickly.



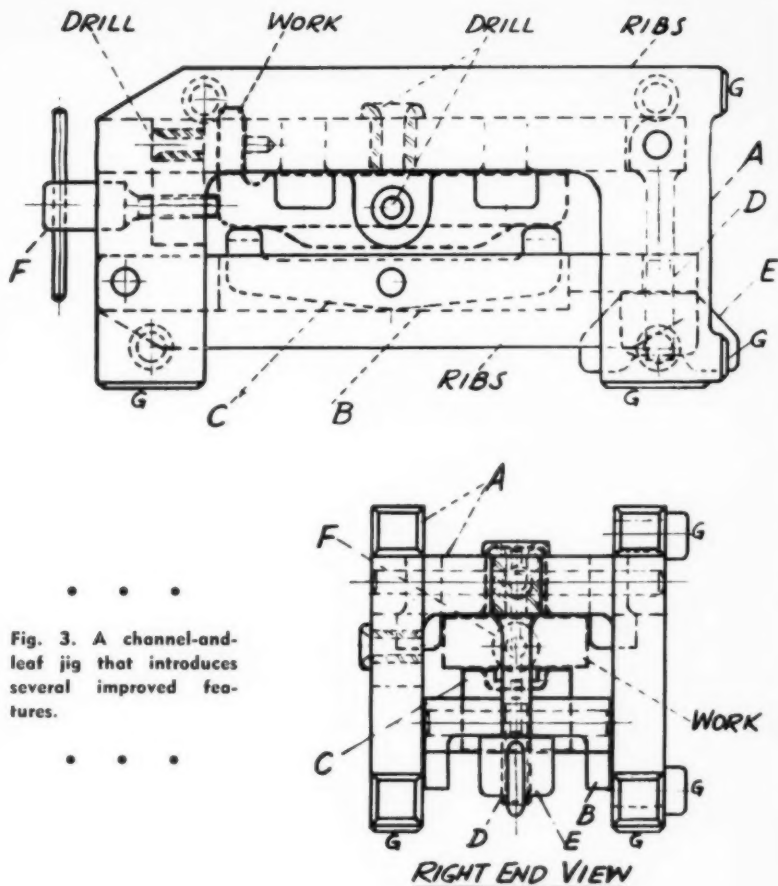


Fig. 3. A channel-and-leaf jig that introduces several improved features.

ing the jig when it is turned "feet up" on the drill press table. In this position, the ribs clear tops of shoulder bushings and latch-hooks or other fastenings for the leaf.

The leaf also has two parallel strengthening ribs, one each side of equalizer C. The equalizer is mounted

deep in the leaf to avoid building the jig too high. The ribs stiffen the leaf for taking drilling thrusts, and offset the weakening effect of the large pin hole for the equalizer.

The jig is placed on its body ribs for loading and unloading. The work, a casting finished on its gaging surfaces,

is placed between pins, and screw **F** is then tightened. Next, the leaf is closed, then draw-bolt **D** is entered in the leaf slot, and wing-nut **E** tightened for clamping the work between the jig floor and equalizer **C**. The jig and work is then turned over on its feet and placed against stops on the drill press table, ready for drilling the holes. Four hardened buttons, on one side of the jig, support the tool while drilling the single hole shown in front.

The surfaces of the jig feet and buttons are ground to "square" the jig in relation to its floor and to the surface of the drill press table. The small hole at the left end of the jig is drilled by standing the jig on its right end.

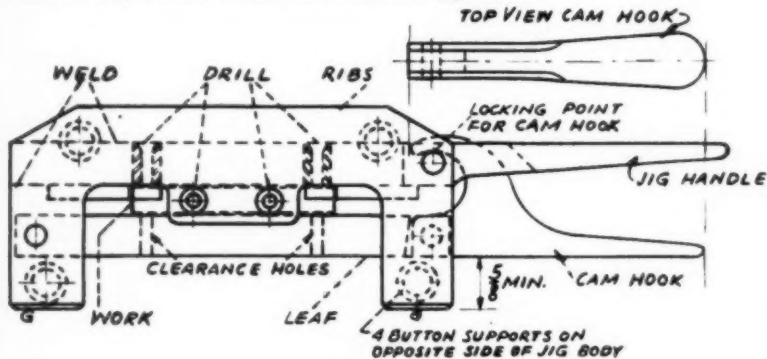
Channel-and-leaf jigs vary considerably in design. Locking the leaf may be done in various ways to suit the job, such as using cams, keys, latch-hooks, or draw-bolts with thumb screws or wing nuts for tightening the leaf. Figure 4 illustrates a quick action channel-and-leaf jig in which the leaf is controlled by a cam-hook that is mounted in the jig-handle. This tool can be operated at high speed because the cam-hook is attached to the leaf and the

leaf can be thrown open by a single movement of the hand on the cam-hook. After removing the work and reloading, the same quick motion in reverse, closes the leaf and locks the work in position instantly. However, work for cam-hook jigs must be of thicknesses within limits of plus or minus 0.003", for locking them successfully. For side drilling, the jig can be turned over quickly by its jig-handle.

The $\frac{5}{8}$ " dimension, shown in the sketch, provides finger space for picking up the tool or for turning it over to drill the side holes. The jig is loaded and unloaded while standing on its ribs. The diameter of two clearance holes through the leaf are 10 per cent larger than the drill diameters; this condition shears off most of the drill burrs, and also prevents the drills from "hogging" through the work.

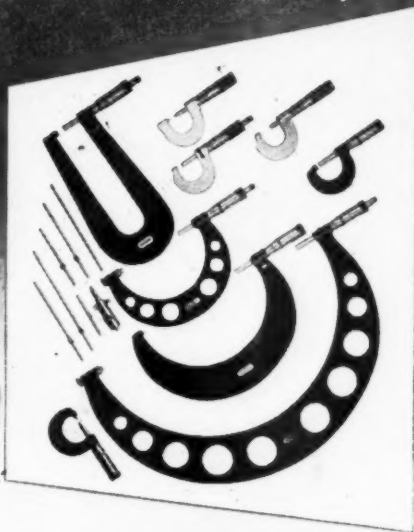
Cam-hooks are made of low-grade tool steel, hardened and mild tempered: two views of the cam-hook are shown in the tool drawing. The jig body is built up of three cold-rolled steel plates, the floor and handle piece, and the two side plates. The three parts are welded together to make the jig body.

Fig. 4. Quick action channel-and-leaf jig in which the leaf can be opened or closed and locked by a cam-hook in connection with a jig handle.



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Most jigs can be assembled by welding, more quickly and much cheaper than milling them from solid steel, or making a pattern and obtaining a casting, which would then need expensive machining.

Cradles for Angular Drilling

A hole drilled in a jig, at an angle to the normal direction of other drilled holes, is drilled by placing the jig in a notched cradle that positions it at the angle required. The purpose of the cradle is to locate the guide bushings for drilling the hole, or holes, in a vertical position. The bushing is thus brought into line with the vertical spindle of the drill press, as shown at A in Fig. 5.

Cradles for large jigs are made of hardwood and the notches, or shelves

for holding the jig, lined with steel plates for long wear. For small jigs, instead of designing a heavy cast-iron cradle, one of light weight can be built of steel plates welded together, as illustrated in Fig. 5. This cradle is composed of two cold-rolled steel plates which are arc-welded, end to end, and between two supporting side plates.

A feature in this jig is that the equalizer has a claw at its upper end, that functions in two directions when it is tightened on the work by clamping the leaf. It pulls the work down against gaging surface B, and in conjunction with its opposite end, clamps the work on the jig floor simultaneously. Bushing A is located at drilling position by placing the jig in the cradle and then pushing the cradle against two right angled blocks which are clamped on the drill press table.

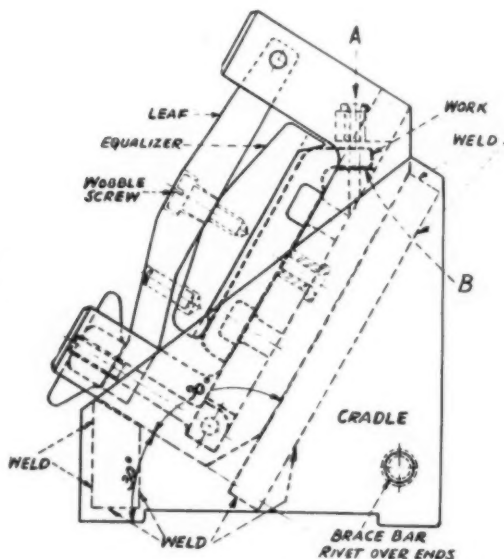


Fig. 5. Built up cradle of four welded-together steel plates for holding a jig while drilling the angular hole at position A.

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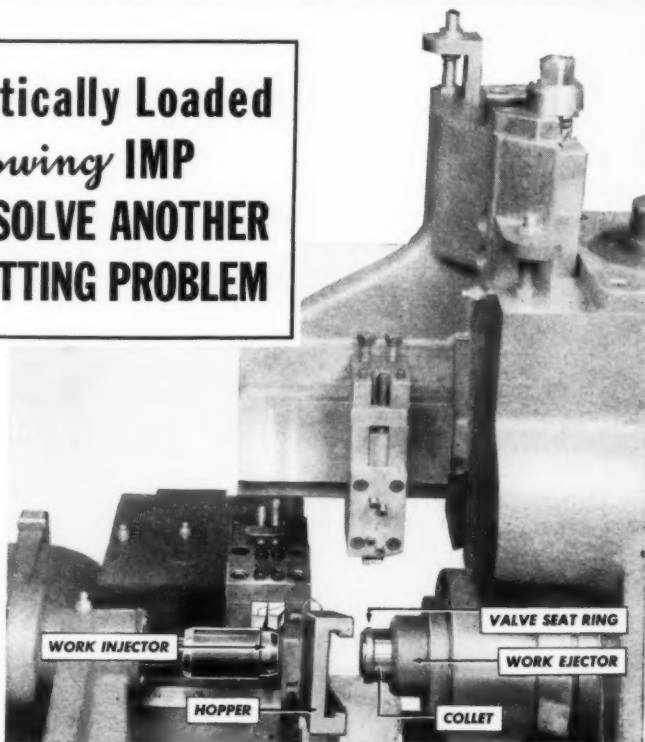
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The entire cycle is automatic; the spindle revolves continually...even during loading and unloading...thereby re-



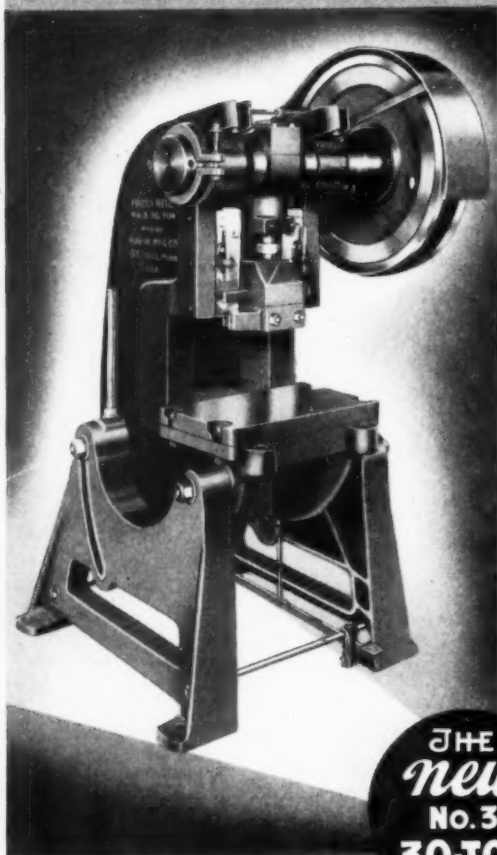
ducing starting and stopping fatigue on the motor, pulley, belts and other drive mechanisms.

The rough and finish boring operations on valve seat rings may also be handled automatically on the IMP Lathe with a different type of automatic loader. For this operation, the valve seat rings are held stationary in an automatic revolving loader and the boring tools are mounted in the revolving head-stock spindle. This method avoids all distortion of the piece, which is clamped between the two faces instead of on the outside diameter.

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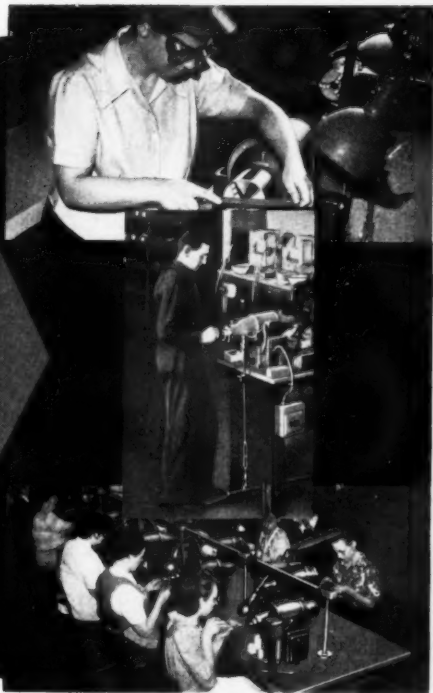
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INCREASED PRODUCTION BY THE USE OF SPEED LATHES

by
S. E. Wright



In many plants, secondary finishing operations of small metal and plastic parts present an obstacle to increased production and lower costs. The problem of speedy, economical polishing and de-burring, grinding and lapping, and other secondary finishing operations is a major one confronting many plants. While other machine tool operations have been improved in the past, it has not been until recent years that any marked improvements have been made in the method of filing, lapping, polishing and de-burring.

Formerly, heavy, expensive engine lathes were employed for some of these operations. For polishing, the part to be

polished was brought up to a revolving abrasive or polishing wheel. In many cases this produced an uneven, unsatisfactory finish and resulted in costly rejects. It, too, was a relatively slow, costly operation.

The origination of the Speed Lathe and its development by the Schauer Machine Company introduced an entirely new idea in finishing—that of revolving the part to be finished. The new method increased the speed and quantity of production, improved the quality, and aided materially in effecting the mass production miracles witnessed in recent years.

The aluminum cooking ware industry

offers a good example of the improvement effected in product, production and production costs following the use of Speed Lathes. Many of the companies making these products had more or less specialized machinery for polishing and buffing. In most cases the polishing wheel was rotated and the ware brought to the wheel. It was found that a much better, more even finish was obtained by rotating the ware and holding the polishing cloth against it. In this way uneven surfaces could also be given a high lustre. A great many of the aluminum goods manufacturers are now using speed lathes and are reporting increased production, coupled with a more uniform and more desirable finish at a lower cost. Fig. 1.

Speed lathes are small, adaptable machines, made especially for speedy, low cost secondary finishing operations. They are not "auxiliary" equipment,

but are recognized as essential units in the production line. Relatively low in initial cost, low in operating cost, they provide a fast, economical means of finishing small parts, and release higher-priced machines often used for this work, for heavier and more profitable operations.

The wide range of applications of speed lathes makes them practicable for use in many industries. They are available in many different sizes and styles to meet individual requirements. Different styles have collet chuck, air chuck, vacuum chuck, mandrel and other holding devices, so that pieces both large and small, regular and irregular in shape, can be firmly, conveniently held. By means of a hollow shaft in the machine, long pieces may be processed.

One company uses a speed lathe to cut plastic tubing into short lengths.

• • •

Fig. 1. Polishing cooking ware with vacuum chuck attached to speed lathe. In this installation the ware is rotated and the polishing cloth is held against it, this results in a finer finish than was possible with the old method of rotating the wheel and holding the ware against it.

• • •





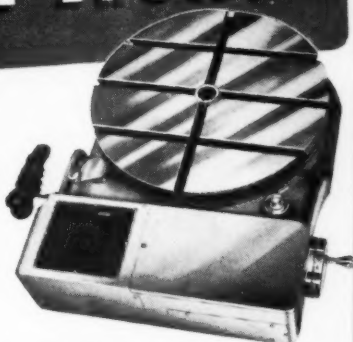
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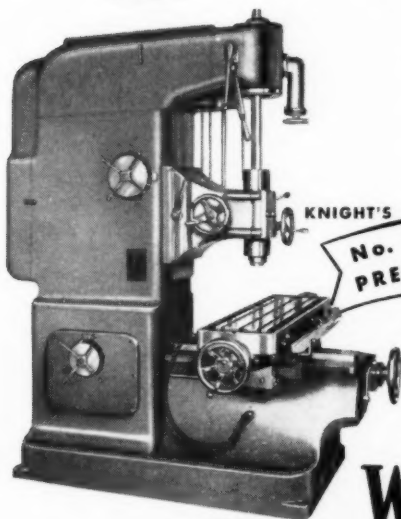
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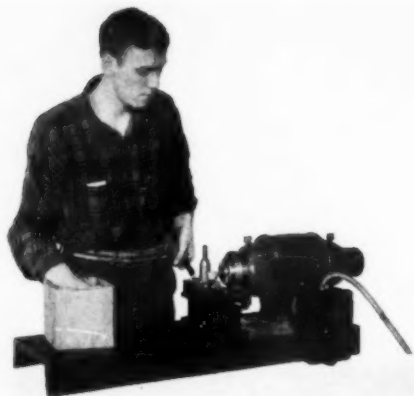
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Fig. 2. Small plastic parts are being trimmed. Tubing is being fed through a hollow spindle in the speed lathe and cut off at the required length. Cut-off operation is performed while machine is in operation.
• • •



This is accomplished by using a stock feeder and a cut-off device next to the speed lathe. The tubing is fed through the hollow spindle, firmly gripped by moving the collet closing lever, and cut off to the desired length. The collet may be opened and closed while the machine is in operation. Formerly a saw was used for this purpose and a production rate of about 2,000 pieces per hour had been obtained, with the new method the production rate increased to 3,500 pieces per hour, with a much cleaner and smoother cut-off than before. Fig. 2.

Very small parts are often awkward to de-burr, especially when a bench lathe is used for this operation. To obtain the production that is necessary to materially lower costs, this work must be done speedily and employ as little labor as possible.

One clock manufacturer solved his problem of deburring and polishing hardened steel pins ranging in diameter from .065" to .480" with three speed lathes. These steel pins are inserted in and removed from the collet without stopping the machine. A file held against the rotating part performs the

deburring operation in less than two seconds.

From clocks to machine tools is quite a jump. A machine tool manufacturer had the same problem of polishing and de-burring large pins. Four speed lathes were located around the plant in departments where the de-burring and polishing work was being done, and a careful check of results was made. Foremen were told to be conservative in their estimates of production. Their reports of increased production varied from 50% to 90%.

One type of speed lathe is designed for vacuum-holding-fixtures, made to fit individual pieces, to hold work that ordinarily is easily scratched or crushed. This type of chuck is also used for holding pieces irregular in shape. In polishing, when the brake is applied, the vacuum is not immediately released, so there is no danger of the piece dropping out of the machine. In the three or four seconds it takes for the machine to stop, the vacuum is broken and the piece may be removed easily. This type has met with great favor in the cooking ware, reflector, and



Fig. 3. A vertical speed lathe is used to de-burr gears in an automobile plant.

• • •

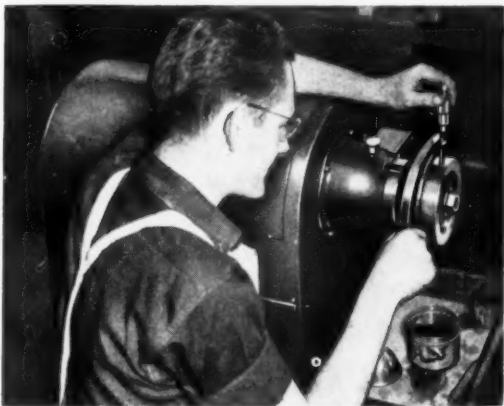
cream separator industries.

Recesses are cut into the holding fixture to accommodate handles or other irregularities in shape. The vacuum may be applied either by a hand valve

• • •

Fig. 4. A thread gage is being inspected on a variable-speed lathe. When equipped with a single motor, a variability of from 75 to 48 rpm is possible.

• • •



or a foot-operated valve. The extremely fast starting and stopping of this speed lathe speeds production by decreasing loading and unloading time.

Die polishing has been a major headache in many industries. Many companies now are using speed lathes for this important operation and report greater ease in handling and lessened shut-down time. One of the advantages of the speed lathe over the engine lathe is that, due to its relatively small size, it can be placed near the machine using the dies, thereby making it unnecessary to transport the dies to the machine shop. This saves time and eliminates the need of tying up an expensive lathe to perform this operation.

In the glass industry dies and molds must be polished frequently. In one plant, in particular, these dies had to be carried to the machine shop in another building. Work in process often had to be removed from a large engine lathe, for the die to be polished. Now several speed lathes take over this job, and indications are that they will pay for themselves in a comparatively short time through the savings effected.

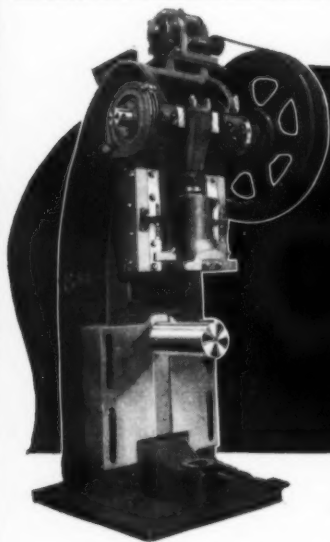
In automobile and airplane plants

speed lathes offer an ideal means for polishing pistons and lapping gears. One automobile company employs a speed lathe in a vertical position for lapping gears. Fig. 3.

Numerous industries make products of different sizes requiring varying speeds of rotation for the finishing processes. For this purpose many plants are now using variable-speed speed lathes. These are available with collet, chuck, or vacuum holding fixtures. When equipped with a single-speed motor, a low of 75 rpm to a maximum of 4800 rpm is obtainable, in a ratio of 6 to 1.

When a two-speed motor is used, a 12 to 1 ratio is available. Variation in spindle speeds is accomplished by movement of a variable-pitch pulley, controlled by a ball crank. Fig. 4.

An interesting application of the speed lathe is the polishing of commutators for small motors. Originally one manufacturer turned the commutator on a lathe and then ground it to a high finish. The polishing was found necessary for longer brush life. By using a speed lathe, a brighter, smoother finish was secured and production increased over 50%.



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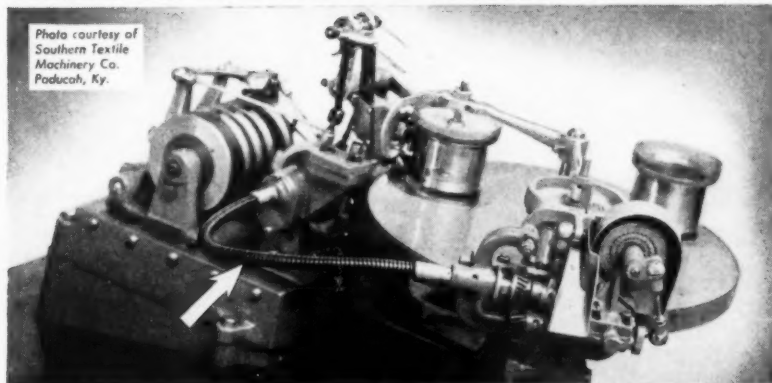
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MACHINE and TOOL BLUE BOOK

August, 1947

Centerless Thread Grinder

By M. S. Ghesdahl

Professor of Mechanical Engineering, Pennsylvania State College. Formerly Director of Research, Landis Tool Company.

The application of centerless thread grinding is best approached through a brief discussion of (a) important components of the machine, (b) crush dressing the grinding wheel, (c) through-feed grinding of screw threads, (d) automatic loader, (e) various materials ground, and (f) production results.

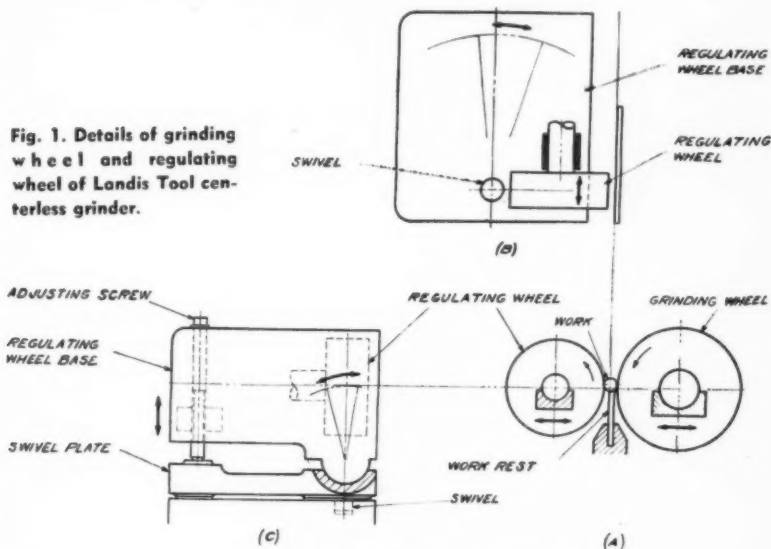
The grinding wheel and its base may be moved laterally, as shown in Figure 1, so as to increase or decrease the throat between the grinding and regu-

Landis' centerless thread grinding technique produces, after heattreating, 15,000 to 20,000 finished screws in one day. Cost reductions, simplified inspection procedures, lowered rejection rate are reported by the author.

lating wheels. A hydraulically operated slide for diamond dressing the grinding wheel is provided and also a crushing unit for form dressing. Movements of the grinding wheel base by means of the handwheel may be as small as .0001".

The regulating wheel base may be

Fig. 1. Details of grinding wheel and regulating wheel of Landis Tool centerless grinder.



moved laterally (Figure 1) to increase or decrease the throat as required for different diameters of work. It can be adjusted forward or backward and, in addition, has a hydraulic traverse movement for diamond dressing the regulating wheel on the exact line of contact of the work. A swivel plate permits rotation to adjust the regulating wheel parallel to the grinding wheel or at an angle if taper work is to be ground. The most essential adjustment for thread grinding is the one permitting the regulating wheel to be tilted to the proper angle to provide the feeding action through the throat. The tilt adjusting screw is graduated in degrees and minutes. A maximum tilt of 10° is possible.

By means of a clutch at the rear of the regulating wheel base, the auxiliary speed reduction range is obtained, giving rotative speeds from 2 to 16 rpm. With the clutch disengaged, the rotative speeds vary from 12 to 96 rpm. The rheostat on the control panel can be used to obtain the desired speed in either range. The low-speed range is used when grinding screw threads from a solid hardened blank in the larger sizes, such as $\frac{3}{8}$ "—11 pitch screws.

The work rest is stationary and mounted directly on the bed of the machine giving unusual rigidity for heavy grinding loads. For thread grinding, the work rest blade is set at the required angle by placing a wedge of the proper helix angle under the blade. Thus, the entire downward thrust due to grinding is transmitted to the bed of the machine.

The five-station drum switch on the control panel permits a rapid change to any desired station. The five stations are; set-up, grind, dress, (for diamond dressing), form (for crush dressing) and regrind (for crusher regrinding).

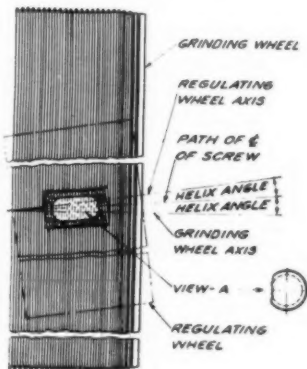
Crush Dressing of the Grinding Wheel

An important feature of the center-

less grinder is the crush dressing unit that is part of the grinding wheel base, and that permits dressing the wheel with the form required for thread grinding or any other form that may be desired. The grinding wheel width is four inches and the crusher may be used to dress the full width of the wheel or only part of it. The crusher is forced against the grinding wheel by means of a handwheel. Pressures of 1600 to 2000 lbs. are required to crush the full width of wheel. The crusher cylinder is mounted on a shaft and so arranged that when it requires replacement it may be removed easily and be replaced by a new crusher of the same groove pitch or profile. The crusher is driven through a worm reduction gear by a constant speed motor. Pressure is applied between the crusher cylinder and the grinding wheel while both are stationary, then the control drum switch is turned to "Form" and the constant speed motor drives the crusher, which, due to the pressure, drives the grinding wheel. The worn crushers may be re-

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Fig. 2. Details of relationship between path of screw blank and grinding wheel of Landis Tool centerless grinder.



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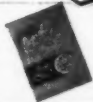
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ground on the machine when the grinding wheel has been formed with a new or good crusher, and the worn crushers are placed on the crusher shaft and driven by the constant speed motor and the grinding wheel is driven at its grinding speed. The slowly rotating crusher is brought against the fast turning grinding wheel to renew the form on the worn crusher. A coolant nozzle cleans the crusher surface as it leaves contact with the grinding wheel.

Crushing technique indicates that it requires about one minute to remove .001" from the radius of the four inch grinding wheel. Surface speed while crushing is about 150 fpm. It only takes from five to ten minutes total time to renew the form on the grinding wheel, assuming about .003" to be removed. Form life on the grinding wheel varies depending upon several factors. However, it would be fair to say that one crushing per day is an approximate average.

Through-Feed Grinding of Screw Threads

A screw thread is a helix. To grind

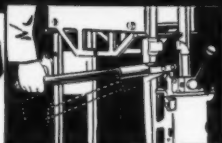
a screw thread the proper relationship must exist between the path of the screw blank and the grooves in the grinding wheel (Figure 2). The path of the screw blank must be set at the helix angle to the axis of the grinding wheel, that is sloping down to the rear of the machine for right hand threads. The regulating wheel which has no grooves on its face must assist in rolling or feeding the screw blank through the machine. The regulating wheel axis must be tilted downward at the helix angle with respect to the path of the screw blank so that the regulating wheel axis is set at double the helix angle to the grinding wheel axis.

When a screw blank is ground on the O.D. while the thread is being generated, it is of interest to know that the pitch diameter and O.D. remain concentric with each other. The Landis Tool centerless thread grinder lends itself particularly to through-feed grinding because the annular grooves in the grinding wheel progressively remove material to generate the full depth thread in one pass through the machine. The last few full depth



Fig. 3. Automatic loader that feeds screw blanks into the centerless grinder.

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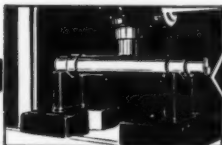
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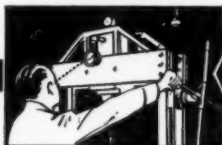
Finger Tip Control opens and closes valve in a jiffy. No gripping effort assures easier, faster operation.



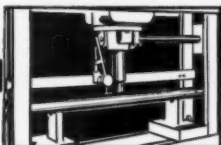
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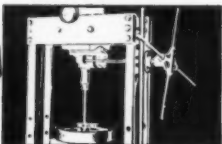


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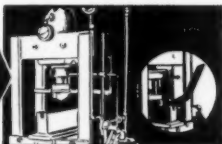


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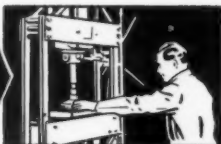
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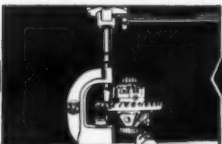
Broaching a key way in a flywheel. 7/8 inch ram travel makes many broaching jobs practical on KRW Presses.



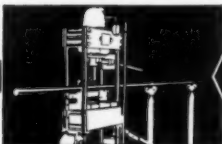
Bending in production lots with simple, inexpensive dies is easily done on low-cost KRW Hand-operated Presses.



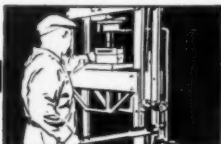
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grooves of the grinding wheel remove a negligible amount of stock to give the finished size to the screw. Therefore, as long as the form on the last groove or ridge of the wheel is satisfactory, the screw thread form will pass inspection.

Screws are being made on these centerless grinders that vary from No. 4 size (about $\frac{1}{8}$ " d. - 40 pitch) to $\frac{1}{2}$ " - 11 pitch. These are being ground from the solid hardened blank to a finished screw in a single pass through the machine.

Automatic Loader

A loader which automatically feeds hardened steel or other material blanks to the throat of the machine makes the production continuous as long as any blanks are in the hopper. Such a loader is shown in Figure 3. Using one-half of an a-c sine wave for agitation, the blanks are induced to move up the spiral incline inside the hopper until they reach the level of the tube leading blanks that are of the same length as diameter, an attachment is provided which automatically feeds the blanks to the machine so that the cylindrical surface is properly presented to the face of the grinding wheel. With loaders attached to the machines, one operator can easily handle a battery of three to five machines, while an inspector makes a spot check of the results at specified time intervals. The loader will handle all commercial sizes of socket set screw blanks from No. 4-40 to $\frac{1}{2}$ " - 11. The rate of feed of the loader may be varied by changing the setting of the rheostat.

Materials Ground

Screw threads have been generated on many kinds of steels, from the annealed condition to stock hardened to Rockwell C-60. Also, stainless steels, aluminum, rubber, plastic materials and pressed metal have been threaded. Five foot lengths unthreaded steel rods (hardened) have been fed through the machine, grinding in one instance an

Acme form thread of 32 diametral pitch in one pass. Stainless steel rods, 42" long and .140" in diameter, have been ground to No. 6-32 pitch screws, wherein it was essential that the O.D. and pitch diameter be concentric. The results were very satisfactory. Experimental work has been done in grinding a No. 1-72 pitch screw where the thread depth is only .009". A 600 grain size wheel was crushed with no difficulty and very satisfactory results were obtained. Pressed or powdered metal screws, which are used in tremendous volume in the electronic field, are ground with unusual ease, accuracy and speed. It has been observed that the grinding wheel wear is negligible when grinding pressed metal blanks.

Production Results

Centerless grinding has demonstrated its utility in production results. Where

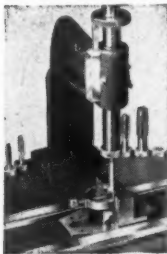
Lassy TAPPER*

and Threader (Single Spindle)

SAVES TIME, TAPS, EXPENSIVE LABOR

"IT MEASURES AS IT TAPS"

Taps twice as many holes, quicker than with a tap wrench. Always right angle holes. Tap capacity $\frac{1}{8}$ " thru 1".



DEPTH GAUGE. An exclusive patented Lassy feature. Always shows depth tap has traveled.

TAP ADAPTERS. No extra spindles needed. Change taps in a jiffy.

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Immediate Delivery

LASSY TOOL COMPANY

PLAINVILLE, CONN.

*Patents Pending

an operator formerly used to thread about 3500 socket set screws a day before heat treatment, one centerless thread grinder will produce after heat treatment from 15,000 to 20,000 finished screws in one day. In the case of small sizes, such as No. 6, No. 8 and No. 10-32 screws, with the length equal to the diameter, the production results have been phenomenal when compared with the former methods of threading these screws. Inspection has been simplified and rejections practically eliminated.

Information received recently indicates unusual length of service from the grinding wheel form. Numerous occasions are recorded of 3 to 5 days of operation without using the crusher on the wheel. Production costs have been reduced as a result.

When grinding threads on pressed metal blanks, the form on the grinding wheel seems to last almost indefinitely. Over 800,000 pressed metal screws were ground at one plant before wheel wear was corrected. Production has increased 15 to 20 times over the former methods. The accuracy and uniformity of results have eliminated rejections almost entirely. With the automatic loader on the machine the efficiency is high.

(From a paper presented to the Machine Tool Forum held at Westinghouse Electric Corporation, Buffalo, New York, April 22 and 23, 1947.)

BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

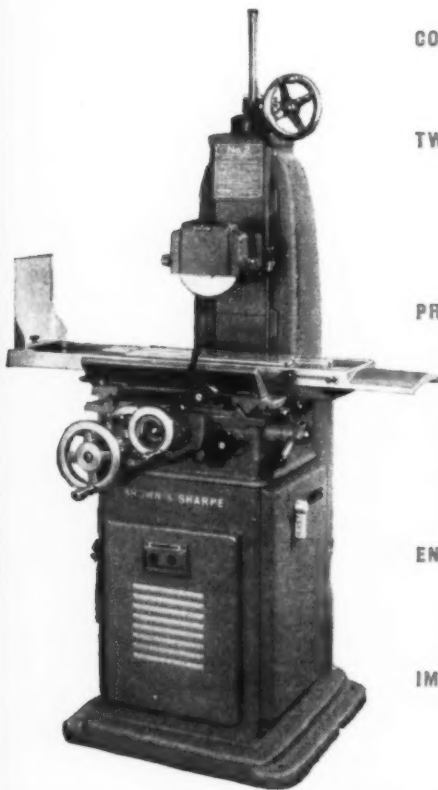
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CONVENIENT CONTROLS ...

assist in fast and accurate manipulation.

TWO RATES OF TABLE FEED ...

19 ft. or 31 ft. per minute. A convenient lever permits operator to readily select rate to suit the nature of the work.

PRECISION WHEEL SPINDLE ...

choice of interchangeable cartridge type units—close-fitting plain bearing unit or permanently sealed, grease lubricated antifriction bearing unit. Provides exceptional grinding finish with quick spark-out.

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SURFACE GRINDING MACHINE

IMPROVED COLUMN CONSTRUCTION ...

for increased rigidity.

EFFICIENT DRIVE ...

either by motor in base or motorized spindle.

Motor in base drives spindle and table through one endless belt, concealed yet readily accessible.

Motorized spindle (shown in insert) is driven through a vibration-dampening coupling by an in-line motor. A $\frac{1}{4}$ h.p. motor in the base is used for table power feed.

Ask for specifications — including numerous attachments for broadening the range of usefulness — of the No. 2 and the No. 2B (With Hand Feeds Only) Surface Grinding Machines. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.



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The NEW SIMPLEX COLLAPSIBLE TAP



*For Greater Speed
Efficiency • Economy*

No. *	STRAIGHT THREAD SIZES	STRAIGHT-TAPER IRON PIPE SIZES	TAP PRICE	STANDARD CHASER PRICE
T 30	11/16" - 7/8" dia.	1/2"	\$ 95.00	\$20.00
T 40	7/8" - 1-3/32" dia.	3/4"	100.00	23.00
T 50	1-3/32"-1-5/16" dia.	1"	105.00	25.00

* A NEW tool that slashes 50% off production tapping time.

* Reversing is eliminated. Chasers collapse AUTOMATICALLY for withdrawal when desired depth is reached.

* Taps blind holes as readily as open holes. Taps practically any metal, fibre, plastic, or hard rubber with equal ease.

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ASM SPONSORS METAL CONGRESS

The 29th Annual National Metal Congress and Exposition will be held in Chicago's International Amphitheatre for seven days beginning Saturday, October 18th, 1947.

W. H. Eisenman, national secretary of the American Society for Metals and managing director of the Exposition, announced locale and dates and stated that the Exposition will again be sponsored by the American Society for Metals.

Floor plans for the 1947 Exposition were mailed to previous exhibitors while mailings to others were made about July 1st.

"In view of the size and importance of Chicago and its adjacent industrial area," Mr. Eisenman said, "it has been decided to open the Exposition on Saturday, October 18th, so that two additional days may be added to the normal five day show. Thus, resident engineers of Chicago and vicinity may visit the Exposition on their own time. Admission will be by invitation only."

It was further pointed out that the general public will not be admitted due to the highly technical nature of the exhibits.

Meeting simultaneously with the American Society for Metals will be the

American Welding Society, the American Industrial Radium and X-Ray Society, the Iron and Steel Division and the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers.

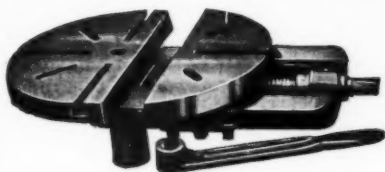
During the week of October 20th, the above named societies will conduct technical programs related to the science of metals.

The 1947 NMCE in Chicago will mark the sixth time that the event has been held in that city. Previous Expositions were held there in 1926, 1930, 1935, 1939 and 1943.

Anticipated attendance is estimated at approximately 20,000 persons from industrial classifications.

The point angle of a twist drill is the angle made by the cutting lip and the axis of the drill. For general purpose drilling a point angle of 59° (118° included angle) is recommended. The point angle may vary somewhat, one way or the other, but the variation should be uniform in both cutting lips. A twist drill point grinding gauge should be used for checking the point angle of both cutting lips.

Use the COMBINATION DRILL TABLE and VISE



SPEEDS DRILL PRESS SET-UPS

Simplifies the most difficult set-ups. Holds work of all shapes securely, without angle plates, clamps or supports. Just drop in the work and start to drill.

The Combination is made in various sizes — diameters from 8" to 27½", weighing from 27 to 600 lbs. Made of the finest materials, for long life. Easy to install. Specify shank diameter in thousandths of an inch. We supply the drill table and vise with shank turned to size specified.

GUARANTEE

We guarantee the Combination will save its cost in labor alone in six months. You are the judge.

FREE TRIAL

We will ship to rated concerns under this guarantee, on free trial. Should you decide not to keep the tool we will even pay return transportation. Order Today!

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Gives full information and illustrates typical, set-ups. Shows use on radial drills. Complete specifications of all models including the square, all steel tables.

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investment



Only new bort diamonds, carefully crushed and graded by the special JK5 process are used in making Secomet wheels. Extra life and clean, sharp cutting action are thus provided.

Grit sizes of 400 and coarser are available in metal, resinoid or vitrified bonds to provide proper surface for all types of tools. 500 grit and finer can be supplied for special applications.

Bonds are selected for their ability to hold diamond particles securely until completely consumed.

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For all the facts, write for Bulletin 45A.

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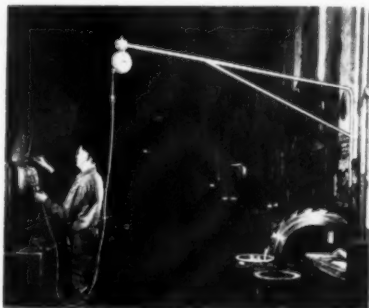
EXTENSION CORD BRACKETS KEEP AISLES CLEAR

By Walter Doyle, Foreman,
Westinghouse Electric Corporation

The bracket shown in the accompanying illustration was developed more than two years ago to accomplish two main purposes: 1) to keep extension cords off the aisle floor, and, 2) to have a permanently installed extension cord within easy reach. The first removes a hazard to safety and the second an extra daily trip to the tool room.

A third benefit has resulted; longer cord life. Since the first extension bracket was installed more than two years ago, not one single extension cord has been replaced. Furthermore, not one bit of mechanical maintenance has been required by these brackets.

As can be seen, the bracket is of all welded construction and is hung on the



wall by means of three pipe clamps that permit its being swung through a full semi-circle. $\frac{3}{4}$ -inch pipe is used for the extension arm and brace; the length is governed by the aisle width and other local factors. A standard $\frac{5}{8}$ -inch bushing is used at the bottom of the clamped section while a standard 3 or 4-inch outlet box is used at the outer end of the bracket arm. A cord reel, containing the length desired, is attached to the outlet box. A stop near the end of the cord permits the connector plug to hang within easy reach of the workman.

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easier ■



MODEL 125
1/2 Inch Drill

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Mall Drills
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It's easy to drill metal, wood or plastics with a MallDrill. This portable electric tool has power to speed the bit through the toughest materials . . . stamina to withstand continuous use . . . and adaptability to fit every kind of drilling job. Its light weight, compact design and trigger switch make it easy to operate . . . convenient to handle. Its commutator can be serviced and its brushes replaced without dismantling the drill. There is a model with the correct capacity, torque, and speed to fit your requirements. Capacities range from 1/4" to 7/8" in steel—correspondingly larger in wood. All are available for 110-volt AC-DC or 220-volt AC-DC.

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26 Years of "Better Tools For Better Work"

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167

Principles and Applications of Metal Spraying

by

Howard Batsford

Metallizing Engineering Company

The principle of metallizing is simple. Metal is fed in wire form into the gun, melted in an oxy-gas flame, atomized, and blown onto the surface to be metallized. Fig. 1. Acetylene, propane, hydrogen, natural or manufactured gas can be used in the gun's universal head.

The successful application of metallizing depends on selection of the correct metallizing wires, preparation of the surface to be sprayed, then the proper technique in spraying and finishing.

The bond between sprayed metal and

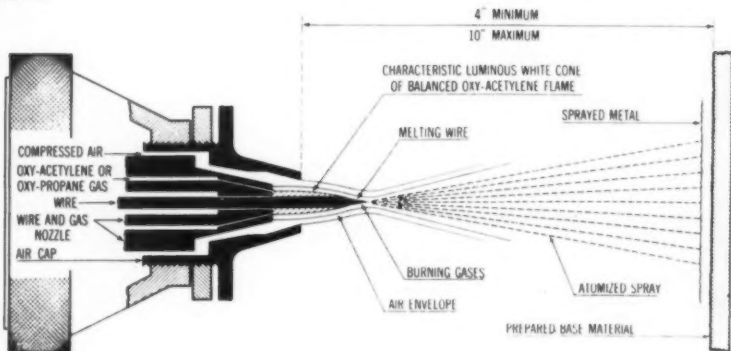
The metallizing process (metal spraying) is in daily use in more than 100 different industries. Here are given a few case histories of metal spraying applications, as well as a brief review of basic principles.

the base material depends on roughening the base material to form keys or openings for the sprayed metal to penetrate (making sure that the base material is clean and free from oxides, oil, water, etc.); and fine atomization, so that the molten particles are small enough to penetrate the smallest openings in the prepared base, and bond to it.

Blasting, rough threading, grooving

• • •

Fig. 1. Typical gun used in metal spraying. Wire nozzle and air cap cross section is shown.



are all used. Certain methods of bonding will care for hardened surfaces which yield to none of the others, and for parts with narrow edges, flat areas with exposed ends, and shafts having keyways or splines, to mention a few.

Sprayed metal structure differs from that of cast, rolled or drawn metals. Although molten on impact, the sprayed metal particles cool rapidly and flatten out, building up a stratified structure of small, interlocking metal particles which is partly pervious due to the porosity of the structure.

Ductility, elongation and tensile strength are greatly reduced when compared with the same metals in cast form, but compressive strength and wear resistance usually exceed that of the same metal in another form.

Because of its unique characteristics, sprayed metal is extremely satisfactory on journals and other wearing surfaces of all kinds. Repeated tests both in the laboratory and the field show that

sprayed journals give from two to five times the life of journals not sprayed.

Both machining and grinding can be accomplished with less trouble than is caused by many alloy materials in solid or presprayed form. Carbide tools are recommended for machining. Usually the best method is to take the first cut to within 0.010 to 0.015" of the finished dimension, taking the balance on the finishing cut, and allowing for filing or polishing with emery cloth.

A series of wheels has been developed for both wet and dry grinding of all commercially sprayed metals. Wet grinding, nevertheless, is preferable, using a wheel of relatively coarse grain and low bond strength to counteract the sprayed metal tendency to "load" a wheel.

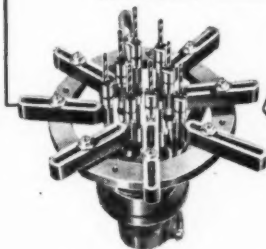
Users have contributed many accounts of problems solved through metallizing. The following were selected as typical of applications that would

Adjustable MULTI-DRILL for Production Drilling

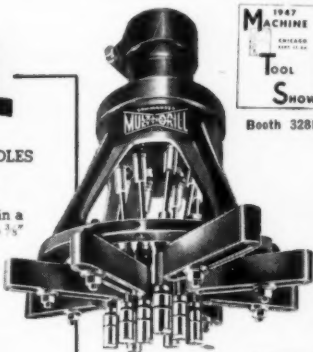
9" DRILLING AREA—AVAILABLE WITH 2 TO 8 SPINDLES

- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to **any** hole pattern on or within a 9" circle; 1/2" minimum center distances; Drill sizes 1/8" to 1/2"
- Special adaptations available

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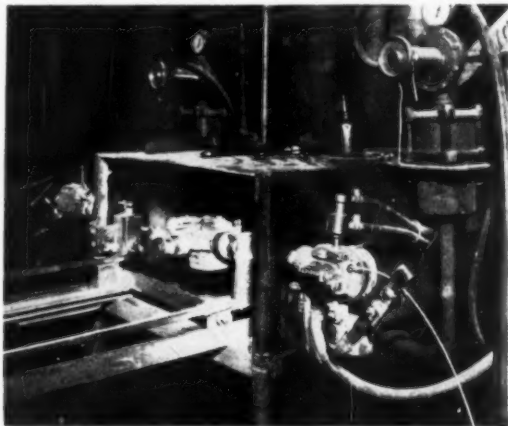
Typical Production Uses

PROTECTING A WELDED SEAM—

The Round Oak Company, Dowagiac, Michigan, solved a production problem in the protection of both sides of the welded seam in powder boxes by spraying zinc with a semi-automatic metallizing setup. A boxlike cabinet slightly larger than the powder box acted as a ventilated hood, to exhaust zinc spray dust into the atmosphere by fan. The box moved in and out on a hand-operated ball bearing mounted track. The

METALLIZING SMALL PARTS IN QUANTITY—Tinnerman Products, Inc., Cleveland, Ohio, has metallized many millions of Speed Nuts with zinc to give them a finish that rust-proofs them yet retains their ability to conduct electricity. The nuts, made of high carbon spring steel, were heat treated to a proper degree of hardness, blasted with Metcolite in tumbling barrels, then placed in wire mesh baskets set on revolving rollers that turned the basket approximately 24 revolutions a minute, tumbling the nuts in a cascading motion in the bottom of the basket. Zinc

Fig. 2. Close-up showing two guns mounted to spray both inside and outside of powder boxes as they pass through cabinet. Exhaust at back of cabinet protects operator from dust.



outside gun was mounted in a vertical position and the inside gun horizontally. A shield operated in conjunction with the box to keep the flames of the two guns from impinging on each other. The guns were lit by hand, but the wire feed was automatically controlled by a microswitch mounted on the cabinet, and a solenoid air valve and air piston mounted on each gun. The guns operated almost continually, 19 hours a day, 6 days a week, at a rate of 225 seams per hour. Fig. 2.

was sprayed on them for 5 to 6 minutes, giving each Speed Nut a zinc finish approximately .0005" thick. The spray guns were run continuously, with a new basket of nuts ready to replace each one coming off the rollers. The whole spraying operation was carried on in a water wash spray booth, so that all the zinc that did not adhere was precipitated into the water trough and reclaimed. The metallizing process was completed in less than one hour, compared to twenty hours for one operation alone



BALDOR

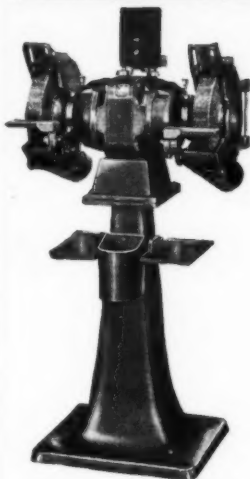
BALL BEARING GRINDERS

SPECIAL CARBIDE TOOL GRINDER

BALDOR GRINDER, series 500, (shown above) is the newest development in grinders designed and fully equipped for sharpening Carbide Tools quickly and accurately;

has sturdy $\frac{1}{2}$ H.P., reversible, ball-bearing motor. 6" Silicon Carbide wheels; adjustable tool-rest tables, water pot. Complete as illustrated and **GUARANTEED 2 YEARS** against burn-out.

BALDOR BUILDS A COMPLETE LINE OF BENCH AND PEDESTAL TYPE GRINDERS, $\frac{1}{4}$ to 3 H.P., 6" to 12" wheels.



At left is BALDOR Pedestal Type Grinder, 12" series, designed for continuous heavy duty service. Available with 2 H.P. or 3 H.P. (Poly-phase) Motor, 1725 R.P.M., 12" x 2" wheels. Manually operated starter, large cast-iron flanges, cast-iron exhaust type guards, adjustable tool rests. Net weight with wheels 425 lbs.

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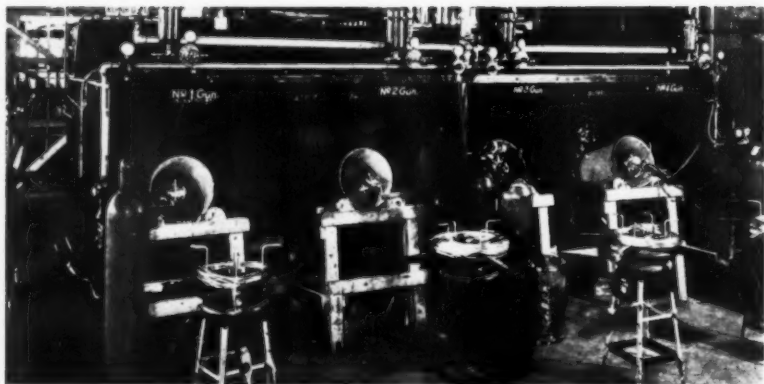
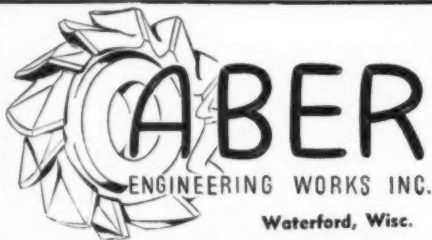
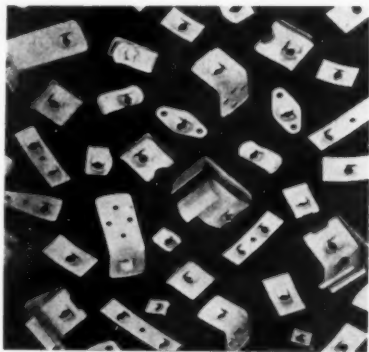


Fig. 3. Production metallizing set-up for coating Speed Nuts with Zinc. Four guns operate automatically and continuously in turning out millions of these corrosion-resistant nuts.

• • •

under the previously used method of cadmium plating. Subjected to salt spray tests, the metallized Speed Nuts stood up for 350 hours before breakdown. Fig. 3.

PROTECTING AIRCRAFT ENGINE SURFACES—Wright Aeronautical Corporation made use of an automatic metallizing machine to cut production time 92 per cent in the spraying of pure aluminum on aircraft engine cylinders.



**Curved Tooth Milling
Cutters - Grip-All Saw
Vise - Aber Cherrying
Attachments.**

Write for literature.

The fins surrounding the steel cylinder barrels had a thickness of only .022", and the barrel itself was only 1/8" thick. Rust would cause swift and serious damage to these parts. The cylinder head itself was made of aluminum alloy, which does not have the corrosion-resistant qualities of pure aluminum, and it too needed protection. Standard requirement was that the sprayed part should show no signs of corrosion after exposure to concentrated salt water spray for 250 hours—but so effective was the method that specimens showed no ill effects after tests of 700 hours.

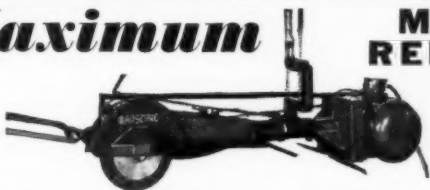
Workmen handling the cylinder heads before metallizing wore cotton gloves, because fingerprints would prevent proper adhesion. The cylinders passed through the automatic blast machine to roughen the surface preparatory to spraying, and the cycle of the blasting machine was purposely made slightly shorter than that of the metallizing machine (see illustration) so that

there was always a reservoir of parts to be metallized. The guns were mounted at exact angles so that the aluminum was sprayed evenly to the full depth of the deep, closely spaced fins. Hand guns were used at inspection stations to touch up any small spots missed in the operation.

WESTINGHOUSE PROTECTS CAPACITORS—Westinghouse Electric & Manufacturing Company, Pittsburgh, gives its outdoor hanger-type capacitors a metallized zinc coating 5 to 6 times the thickness of hot-dip galvanizing, to afford effective protection against rust and atmospheric corrosion. Even though scratched so that the zinc coating was penetrated, the metallized coating provided cathodic action to protect the steel. In a test, a steel sample was scratched and drilled into the steel base, then immersed in salt water and exposed through two months of wet weather in a corrosive industrial at-

Maximum

METAL REMOVAL



For maximum metal removal, use a Marschke Swing Frame Grinder. Massive, yet easy to maneuver, this Marschke Grinder provides smooth, true wheel rotation for steady contact between wheel and work. Furthermore, there is provision for correct wheel surface speed during all stages of wheel wear.

Marschke's smooth spindle rotation and correct speeds assure maximum metal removal with minimum wheel wear. Sim-

plicity of construction, plus balance and maneuverability, contribute to efficient operation. Bearing housing assembly completely protects against grit and dirt. These Marschke Grinders quickly pay for themselves and give many years of trouble-free service.

Grinders with wheel sizes of 16", 20" and 24" are available for heavy duty foundry service. Write for further information.



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BRUSH BACKED
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mosphere, yet neither the holes nor the scratches showed any signs of rust or corrosion.

Typical Maintenance Uses

REPAIRING A LATHE—C. G. Conn Company, manufacturers of musical instruments, developed a special lathe for machining the valve casings and rotors used in rotary valves for French horns and bass trombones. It held tolerances so closely that lapping of the rotors was unnecessary. Then, during the war, the lathe was stored, and upon being taken out for re-use it was discovered that the spindle bearing surfaces had deteriorated so much that the lathe could no longer be depended upon for precision.

By metallizing, the spindle was restored in less than 24 hours. After preparation in the tool room, the welding department took over, making its own setup for the metallizing process. The

spindle was restored to its original dimensions with 3/16" of 40-carbon steel, then ground and the bearings rescraped. Cost was \$14.27.

REPAIRING A 3,800-LB. BREAST ROLL—At the St. Lawrence Paper Mills Co., Ltd., Three Rivers, Quebec, after successive grindings to eliminate ridges had reduced it beyond the usable stage, a 3,800-lb. breast roll was rebuilt for \$1,051.04. The cost of a new roll at the time would have been about \$2,100. The standard roll is 22" in diameter, and the roll was rebuilt after it had been ground down to 21 3/4" diameter.

The roll was first set up in a large lathe and a light cut taken, using a coarse feed. On this fine-threaded surface was deposited the surface preparation. Three metallizing guns were then set up, and high carbon, high chrome stainless steel sprayed to 3/16" on the radius, in one pass. By using three

NEW

3 DORMAN IN 1

TAPPERS

INTERNAL or EXTERNAL THREADING

HAND OR MACHINE TAP

ACORN DIE

ROUND SPLIT OR BUTTON DIE

CAP. IN STEEL 2-56 TO 3/8"
MAX. LENGTH EXTERNAL THREAD 2 1/2"
TWO ADDITIONAL SIZE TAPPERS CAP. TO 1 1/4"

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"NO EXCUSE FOR FILE ABUSE"

—says Pop the Foreman

ON mass-work especially, the proper use and care of files enters heavily into savings in man-hours, materials and new-file costs. Here are some timely suggestions which it will pay to post around the shop.

- Don't throw files among other tools or objects.
- Don't lay files on top of, or stack them against, one another. Keep them separate — either standing with their tangs in holes or hung on a rack by their handles.
- Keep files in a dry place so rust will not corrode their cutting edges.
- Keep files clean of filings or "chips." After every few strokes tap the file on wood (not

on metal) to loosen the chips. Files should also be brushed frequently with file brush or "card."

- Never "tear" into the work with too much pressure on the forward, or cutting, stroke.
- Never "drag" the file back under needless pressure.
- Use *The right file for the job.*

The better the file the greater the reward of care. Nicholson and Black Diamond files are of highest quality — made to serve long under normal circumstances, still longer under proper use and care. For your file needs, contact your industrial distributor.



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NICHOLSON FILES FOR EVERY PURPOSE

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• • •
Fig. 4. Restoring a 3,800 lb. breast roll. This roll was rebuilt for \$1,-051.04, whereas a new roll would have cost \$2,100.
 • • •



guns, the time was cut to one-third, and by manifolded six oxygen bottles together and three acetylene bottles for each gun further time was saved, since the gas setup had to be changed only once. Then a light cut with a carbobloy bit removed part of the rough finish, and the grinder finished it to size. Fig. 4.

BEARING FITS FOR HIGH SPEED SHAFT—In just under six days, at Allegheny-Ludlum Steel Company, a Timken roller bearing on a high speed

shaft of a 1,600 hp. Farrell-Birmingham reduction gear unit was put back into service through metallizing. (This time included trucking the 35-ton high speed shaft to the repair shop 25 miles away and back.)

Both bearing fits on the 18" shaft had been ruined by being cut down to .008" undersize. The shaft consisted of two cut "single helical" pinions, one right hand and one left hand, on which were mounted two 14-ton flywheels, complete with two 16" roller bearings.

OILY FLOOR TROUBLES STOPPED with FULLER'S EARTH!



An oil and grease absorbent that replaces sawdust or wood shavings. Lessens fire hazard! Stops accidents due to slipping on oil or grease! Low priced — economical — safe! Write for **FREE SAMPLE** or ask for trial order at quantity price!

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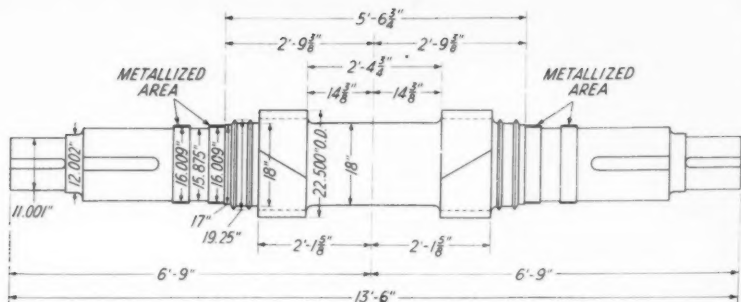
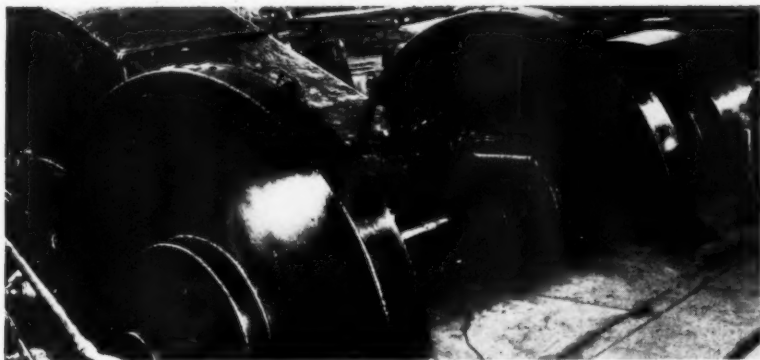


Fig. 5. The Farrell-Birmingham reduction gear unit, and drawing of the high speed shaft showing area which has been metallized.

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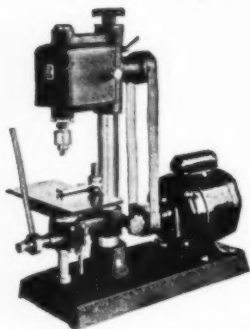
After taking the flywheels off and removing the cones, it was found that the shaft was from .004" to .008" under-size on the cone fits. The fits were turned down to 1/16" undersize and the shaft prepared by dovetail grooving, about 1/16" wide and 1/32" deep continuous spiral of 8 threads to the inch. Then the bearing fits were metallized to 1/4" over-size and ground to the final diameter size of 16.009". Finally the new cones

were boiled in oil and shrunk into place, bearings assembled and flywheels pressed onto the shaft.

On the intermediate shaft of this gear reduction unit, the 17" roller bearings were loose. The same procedure was followed, finally grinding to 17.003" before mounting the new bearings.

With a straight mineral oil, the bearing temperatures before the breakdown were running about 160 deg. F. After

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metallizing, the oil was changed to an "extreme pressure" and the bearings ran at between 125 deg. and 135 deg. F. Fig. 5.

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Dept. 217-N, Racine, Wis.

Using Carbides in Metalworking



by
H. A. FROMMELT
Consulting
Engineer

Method of carbide
milling SAE 1020 cold
rolled steel with a 1
H.P. milling machine
is analyzed.

An objection frequently raised against undertaking a program of conversion to carbide for machining operations is the lack of horse power in existing equipment. The standard line of milling machines starting at 1 or even less horse power and going to 20 (in some modified forms, as high as 25) is con-

sidered inadequate, and so much so that according to this objective it does not justify even consideration for a change-over from the older cutting materials to the sintered.

Some conversions on the smaller and even smallest horse power machines will be discussed briefly; but before that is undertaken it is well to consider an argument in favor of using present equipment because (1) it is simpler to operate these pieces of equipment where removal rates cannot be upped beyond a relatively small percentage bracket and (2) because proving up on present equipment is the surest way to convince Management that an investment should be made for larger equipment.

The all too prevalent but erroneous opinion that carbide milling, particularly of steel, demands large horse power consumption for efficient and effective machining is corrected in the following simple operation of milling a "shoe" of SAE 1020 cold rolled steel. A 3" diameter step mill is mounted on a No. 00 bed type machine which is equipped with no more than a 1 hp motor. This is the smallest milling machine made (by this company) and yet without the addition of a flywheel or any other

specially engineered apparatus or attachment, this bed-type milling machine, with the apparent limitation in power, performs an interesting operation on this component.

The cutter used for this operation is a 3", 4-bladed mill similar in design to the one shown in Fig. 1. Four steps are produced by this mill. The method is to divide a .200" deep cut into four steps, namely, three are .060" deep and one, the finishing step, .020". The design of cutter has many advantages: the ability to take a deep cut and at the same time arrange for the last step to be in the nature of a "finishing" cut and, second, the taking of cuts with small powered machines. Obviously, the feed rate is based on the feed per plane, which is effected by one tooth. Hence if one tooth is taking a .010" chip load and the rpm (of a 3" cutter) is 600 rpm then the feed rate will be 6". Thus the amount of power demanded by the cutting action of the four blades is only one-fourth that of a true 4-bladed face mill.

The application of this 3" 4-bladed step mill to the task of milling cold rolled SAE 1020 steel "shoes" (a component used in the construction of a small lathe) will now be discussed.

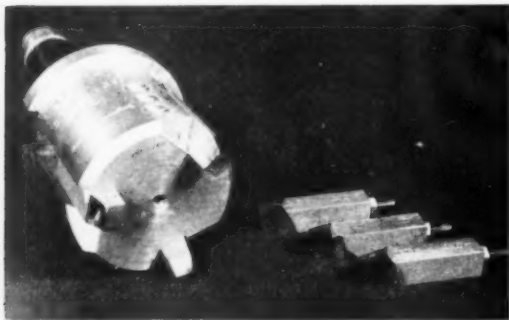


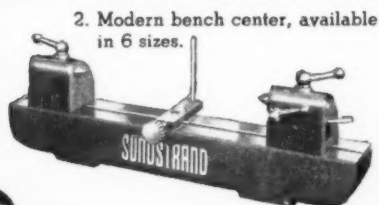
Fig. 1. The 3", 4-bladed mill used to mill a "shoe" of SAE 1020 called rolled steel, is similar to the 3-bladed mill shown in the photograph.

Check Balance and Runout Accurately WITH THIS undstrand Equipment

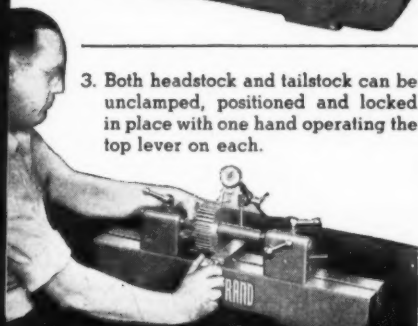
Illustrated are a few of our complete line of balancing tools and bench centers. If you need modern, accurate equipment for checking balance and runout, investigate this line today.



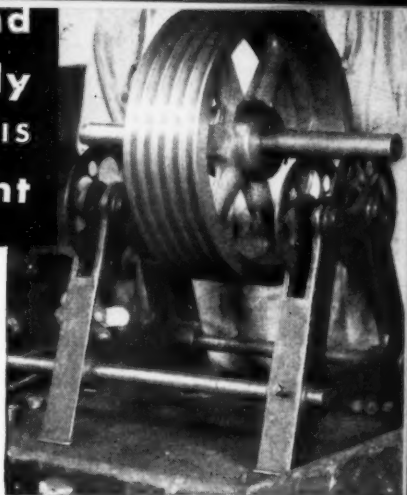
1. Extra heavy duty type balancing ways—floor and pit type.



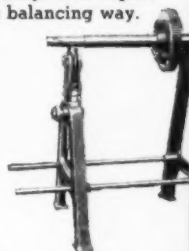
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Since the material is cold rolled steel whose BHN is 160, the surface foot rate from table 1 is 624. The rpm to correspond to this surface rate is 705. In the first—an experimental run—the feed rate was set at 6" to correspond to a chip load of something over .008".

Table I

BRINELL HARDNESS

OF STEEL	SFM
160—180	624—593
180—220	593—536
220—300	536—447
300—420	447—338

But before proceeding further with chip load and allied determinations, it is well to consider the planning step in the choice of a cutter. This has already been referred to and the reasons for its choice here hinted at in the exposition of the cutter design. The basic reason for immediately using this mill on a 1 hp machine is this: the chip load can be kept at the usually high level for good life and steady cutter operation without having to deal with the correspondingly high feed rate and, in turn, with the high power requirements that go along, almost but not quite in the same ratio, with the feed rate. Hence it is possible to specify a high tooth load and yet enjoy the feed rates that only a small piece of equipment such as this is capable of.

Moreover, and this is an important item, the cutter care and re-conditioning costs of this type of mill are only a fraction of those of the regular face mill. The blades are ground as any single point tool on a pedestal grinder, off-hand. They are then assembled in the cutter and on the job in the following manner; The milling table is brought close to the cutter body and the first blade inserted in slot No. 1. Then the table is lowered, according to the dial reading by, say, .060" and the

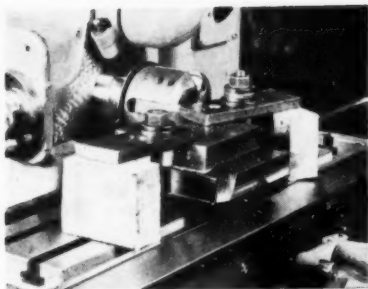
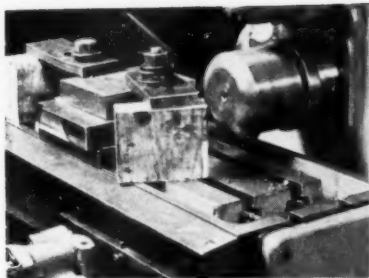
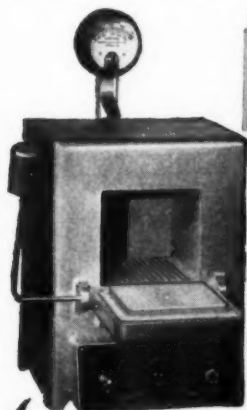


Fig. 2 and 3. The milling operation is performed on a 1 H.P. milling machine. Right: the milling operation on the "shoe" is being performed. Left: an excellent view is obtained of the cutter at rest.



second blade is inserted in slot No. 2 (the blade and slot numberings must

coincide in this design) and this is repeated for Nos. 3 and 4. Since the blades are set in different circles the slot depths are milled to varying dimensions so that the blades can be set to the bottom of the slot without any further loss of time. Thus the cutter is quickly assembled. When the blades are dull, these, not the body, are removed and a



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mated, it is a remarkable performance in view of the fact that the 1 horse power is available for both spindle and table drive, plus all of the losses between the motor and these points of power take-off.

The advantages of carbide milling here may be summed up as follows:

1. Increasing the production rate about double.
2. Decreasing the cutting time by one half.
3. Performing the operation "dry"—as are all carbide jobs—and hence the advantage of a clean, attractive set-up is made available to the operator.
4. Changing over from H.S. Steel to carbide at a total cost of less than \$50.—the cost of a cutter body and several sets of blades.
5. Greatly decreased cost of grinding and cutter re-conditioning as compared with the older mills and methods.
6. Excellent finishes and extreme ac-

curacy. Note in this connection that the heat of work goes into the chips and not the workpiece, hence distortion due to heat of work is practically eliminated.

No capital outlay has been made to achieve this conversion except the expenditure of a sum that is estimated at less than one-half the cost of a H.S. steel cutter for the carbide step mill, and the upkeep of which is far less. To the above should be added the following interesting data: By actual test, a H.S. steel cutter milled 100 of these sides before calling for a re-grind; the carbide cutter milled 400 or approximately 8,000 square inches before re-conditioning was necessary.

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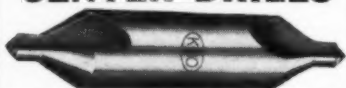


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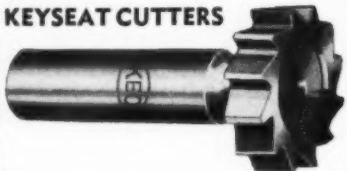


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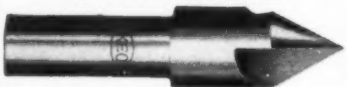
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KEO CUTTERS

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40,000. The workpiece face is 5", length 8" and the depth of the block (part of a hydraulic pump mechanism), is 4".

The identification of this component, as to classification is completed with the information of its psi. Its surface rate can now be specified as somewhere between 300 and 450. A spindle speed of 500 is selected which corresponds to a surface rate of 385.

Again the step mill is chosen but this time cast iron cutting grades of carbide are specified. This design of mill has been thoroughly explored in the preceding paragraphs. The advantages of the step mill when working within the limitations of 3 hp are now patent and should be made use of here. For this operation a 4" diameter mill is used.

The step mill is tested, however, in an approach run: In the first run the feed rate selected is 10" and hence the chip load is .026".

Although the feed rate is even now twice as high as would be possible with older methods, the rate is boosted to 15" and hence the chip load goes to approximately .040" load per tooth. These are excellent loadings per tooth and will yield high cutter life.

Since the conditions established in Run No. 2 are being used for production purposes, it is important to consider the overall results. The metal removal rate is 2.5" wide cut, times .200" depth of cut, times 15 ipm or 7.5 cubic inches of metal removed each minute with a 3 hp motor. The K factor is thus less than .5, in fact .4. This class of cast iron can be milled, in larger machines with one third hp per cubic inch per minute, used. The operation under consideration calls for milling to a shoulder (the cut is 2.5" wide while the workpiece face is 5" wide). This increases the power consumed since the blades are in contact with the workpiece through a longer arc.

These operations are actual production jobs the conversion for which has

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been made a sufficiently long time since to establish the practicality of the carbide milling technique.

Thus, the smaller horse power machines can be used to mill economically as compared with the same machine to which is applied an older technique.

In the 3 hp set-up for cast iron and with a feed rate of 15 ipm the increase over the other methods at least 75% to 90%.

But if the comparison is made with a much larger machine, the limitations of the lower brackets of power become obvious immediately. Thus, this operation was set up on a 50 hp carbide milling machine, equipped with all of the features considered necessary for the streamlined removal of metal. The 5" block of cast iron was set under an 8" diameter cutter and 150 cubic inches of this material were removed per minute. The depth of cut was .400 and hence the area of the cut section was 2 sq. in. At a removal rate of 150 cu. in. per minute, the feed rate is 75 ipm. This is possible with a top rate of 90 ipm. The time for the cut, on this 10" long component is about 8 seconds taking a .400" depth of swath; with the 3 hp machine the cutting time is 45 seconds with only an $\frac{1}{8}$ " depth of cut. The comparison is emphasized by the removal rates:

3 hp—7.5 cubic inches per minute
50 hp—150 cubic inches per minute

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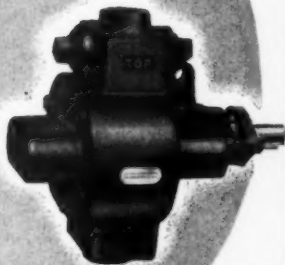


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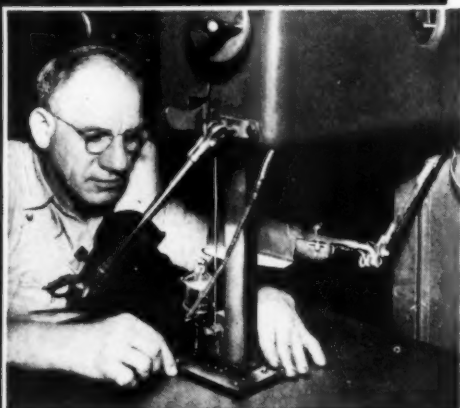
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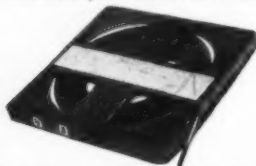
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Ways are made of hardened and ground steel ensuring accuracy and long life to the slide. Dies will stand up longer under continuous operation.

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Advanced design, massive construction, of high-tensile semi-steel casting, heavily ribbed, to resist distortion.

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Solid web flywheel is mounted on two sets of roller bearings.

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The complete crankshaft assembly and bearing blocks can easily be removed or replaced without any fitting or adjustment. Maintenance is quick and simple.

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Clutch is of simple and sturdy design, using a round clutch pin made of chrome nickel alloy steel, hardened and ground engaging in three drive pins. Positive one revolution device which can be quickly changed for repeat operation.

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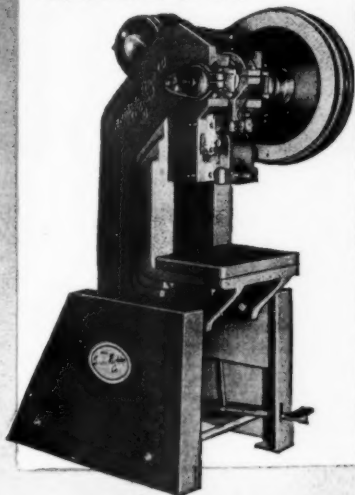
Distance from slide to bolster stroke down, adjustment up is 9" center of slide to frame 7" opening through back 9½".

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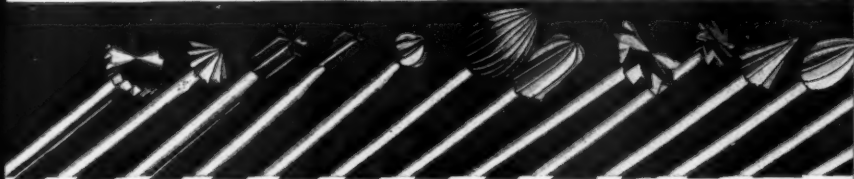


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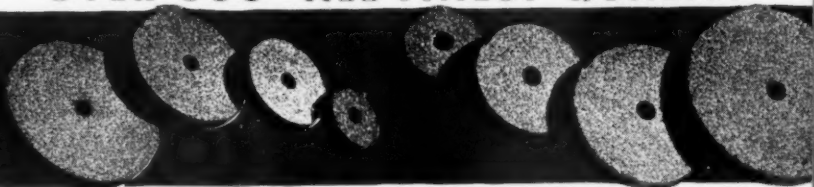
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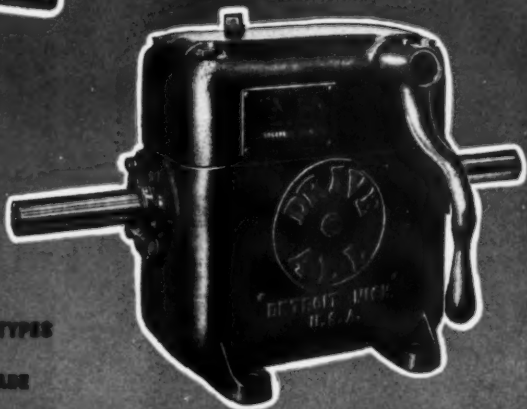
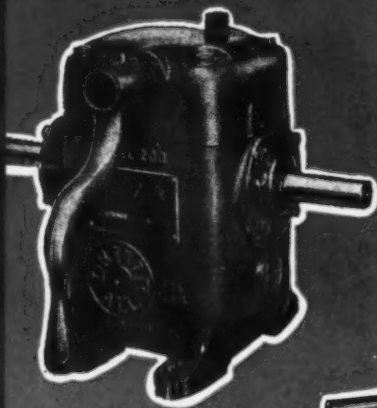
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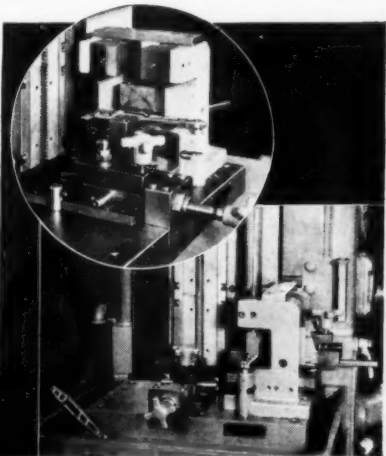
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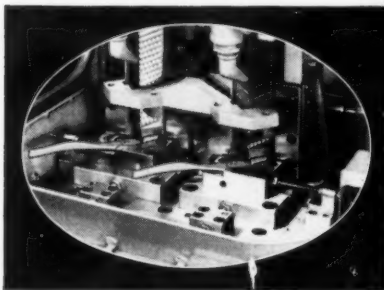
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(Above)—A simplified manually operated two station fixture to produce two sewing machine parts to close limits. A cast iron Slide Block is straddle broached at the left hand station; a slot in a malleable iron Main Connection part is surface broached at the right hand station. Parts are clamped manually, and floating jacks, also manually-operated, are provided to prevent springing of the Main Connection part. Exceptionally fine finish is obtained on both parts which interlock in the final sewing machine mechanism.



(Above)—This *American* designed fixture for broaching the jaw teeth of plier halves consists of two work stations. Separate work locators are supplied for each type of plier half. Parts are automatically clamped and unclamped by means of an air cylinder. Location is taken from the previously drilled hole in the forged steel part. Production of plier halves is increased considerably over the previous machining method.

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American[★]

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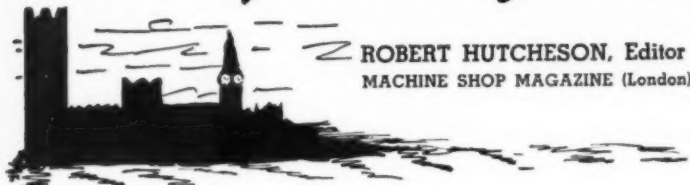
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Letter from England



ROBERT HUTCHESON, Editor
MACHINE SHOP MAGAZINE (London)

More and more interest is being displayed in research and a new organisation has just been formed to undertake fundamental research in mechanical engineering. It has been formed by the Government through the Department of Scientific and Industrial Research. The mechanical engineering department of the National Physical Laboratory will form the nucleus of the new organisation, and its superintendent Dr. G. A. Hankins, D.Sc., M. Inst. C. E., M. I. Mech. E. has been appointed Director of the new research establishment. As with all other research bodies in the D.S.

I.R., the Director will be advised by a board consisting of eminent scientists, technicians and industrialists. Until premises can be obtained for the establishment of a station, the new organisation will make use of the facilities available at the National Physical Laboratory and at the universities, and it is estimated that the eventual annual expenditure of the new organisation will be in the region of £250,000 to £350,000.



Robert Hutcheson

The Centenary Celebrations of the Institute of Mechanical Engineers are being held in London this week. On Sunday (8th June) a Thanksgiving Service was held at Westminster Abbey, and during the week technical sessions were being held at which thirty-six short papers were presented by engineers distinguished in their particular fields; visits were made to works and other places of engineering interest; social events were held, and the week concluded with a banquet at the Guildhall at which the Lord Mayor and the Prime Minister were among the guests.

Considerable use is being made industrially of glass wool which has good electrical, sound and heat insulating properties. It is used either in a loose condition when it can be packed in a jacket round refrigerators, gas and electric cookers, boilers, etc. or formed into panels or mats of a semi-rigid nature, the glass fibres then being bonded with a synthetic resin.

One railway at least is reported to be using the material to lag its new locomotive boilers and is gradually converting its existing locomotives. The material is used in the form of mattresses enclosed in wire netting with boxed edges, a form of insulation which can be easily attached and removed. The material is fireproof and is not affected adversely by moisture, and so it has extremely wide fields of application.

Your Ambassador to this country, His Excellency the Rt. Hon. Lewis W. Douglas, will be taking an interest in British Engineering. On 10th July he will be the guest of honour at the Quarterly Luncheon of the Gauge and Tool Makers' Association and will address the members after lunch.

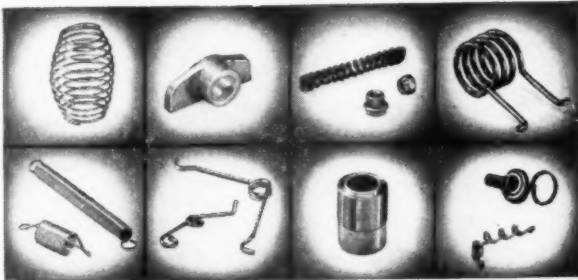
Arrangements have been made, with the approval of the British and Danish Governments, to hold an All-British Exhibition in Copenhagen in September, 1948. The Exhibition will be

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organised by the British Import Union of Copenhagen in collaboration with the Federation of British Industries, as was done in the case of the successful British Exhibition in Copenhagen in 1932.

* * *

An exhibition of wide interest to engineers is the Engineering and Marine Exhibition (incorporating the Foundry Trades' and Welding Exhibitions) to be held at Olympia, London, from August 28th to September 13th, 1947. Practically every branch of mechanical engineering endeavour will be represented.

Lord Dudley Gordon, the newly-elected President of the Institution of Mechanical Engineers, has consented to become President of the Exhibition this year.

In the Foundry Section—a feature started some years before the war—the contrast between the production methods of pre- and post-war eras will be vividly demonstrated by the exhibits. The march of mechanisation, the wide increase in the use of electricity and compressed air—and the improvements in lifting and shifting equipment, will tell their own story.

The Welding Section too, reflects the considerable advances which have been made in this most important sub-section of the engineering industry. Here, both the electrical engineer



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and the machine tool designer have made their presence felt and their influence is written large upon the many up-to-date welding and cutting plants and their accessories which will be on show.

Of considerable technical and popular interest will be the demonstrations by divers of under-water metal-cutting by torch. A great glass wall tank will permit of close inspection of the methods employed and the apparatus will be explained in detail by the exhibitors co-operating in this particular feature.

Amongst the new sections is that devoted to electricity—embracing the whole gamut of generation, transformation, distribution and utilisation of power in engineering, on shipboard and in signalling.

The public will be able to watch the reported progress of ships at sea by means of shore-to-ship teleprinter service working on the stands of a world famous underwriting organisation. Messages between visitors and their friends on the high seas may also be handled.

Another demonstration of interest, as much to the technician as to the less well-informed man in the street, will be the first public glimpse behind the screens of radar in its modern ap-

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Anyone can operate a Black Diamond. Even the most inexperienced can keep all small drills sharp—and true centered, with smooth lips accurately ground to exactly the same length—at the proper angle and with correct clearance for fast, precision drilling.

Black Diamond Grinders cut 50% and more on drill grinding costs, sharpen without waste of expensive drill stock, reduce drill breakage and work spoilage to a minimum.

The built-in Diamond Point Dresser keeps the grinding wheel ever-sharp and the Web Thinning Attachment cares for all types of Notched points to perfection.

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NATICK, MASSACHUSETTS

plications. Upon the roof of Olympia will be a radar station fully equipped with the most modern devices to enable the onlooker to "see beyond the horizons" of the vast canopy of the exhibition building.

Notwithstanding the difficulties of arranging social and technical gatherings in these times, much attention is being paid to the welcome, accommodation and entertainment of the many technical associations who have for so many years made this Exhibition the venue of their special gatherings.

Let those who have begun to believe that British Industry is stultified by the difficulties besetting it—those who doubt that from the sword there can emerge a shining plow share—those who will not readily admit that war-induced inventiveness can be turned into brilliant peace-time technique—learn for themselves from this great Exhibition that Britain's technical, engineering and commercial ability stands unimpaired and even fortified to face its future.

During the week-end 6th-9th June the Gauge and Tool Maker's Association held its first Convention at the seaside town of Bournemouth. It was intended originally to hold technical sessions during the day and social activities, in which members' ladies could participate, during the evenings. Finally, it was thought best to keep the whole Convention on a purely social footing and thus give members every opportunity of meeting and getting to know one another.

The value of United Kingdom exports for April was £82.7 million. This figure is slightly higher than in March (82.6) and shows an appreciable recovery in the rate of export, since the Easter holidays reduced the number of working days (excluding Sundays) to 24. Taking 26 days (excluding Sundays) as a normal working month, exports during the last nine months have been in million £



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CONTINUOUS HINGES

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Lengths to 120"

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SEMI-OFFSET

August	78	January	88
September	74	February	82½
October	87½	March	82½
November	92	April	89½
December	90		

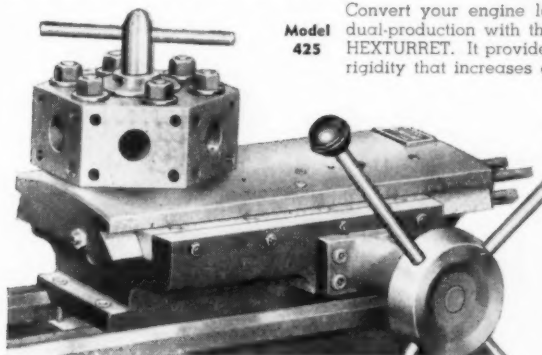
The value of exports by U.N.N.R.A. included in the April total was £2.2 million as against £1.6 million in March. The corresponding figures for N.A.A.F.I. were £0.6 million and £0.5 million respectively.

Allowing for the rise in prices since 1938 the volume of exports in April is estimated provisionally at 98 per cent of the 1938 volume. The volume figure for March, a longer month, was also 98 per cent, the final figure for February being 92 per cent.

Apart from electrical goods and apparatus, exports of which were practically unchanged, all the metal groups showed increases compared with the first quarter. Exports of machinery, at £14.3 million, reached a record figure representing one fifth of all exports of manufactures. Exports of vehicles amounted to £11.5 million and showed a substantial recovery from the relatively low figures for February and March. There were marked reductions in exports of textiles.

Imports in April (£147.1 million) exceeded the high March

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Convert your engine lathe for dual-purpose and dual-production with the new self-indexing ENCO HEXTURRET. It provides the speed, accuracy and rigidity that increases output and cuts production costs.

New Model 650 for lathes from 12" to 16", 6½" working travel, 1¼" tool holes. Model 425 for 9" to 12" lathes, 4½" travel.

Two weeks delivery on Hexturrets for Atlas, Clausing, Craftsman, Logan, Power-Kraft, Sebastian 12", Sheldon 10", 11", and 12", South Bend 9" and 10" lathes.

Write for illustrated folder and prices. See it at National Machine Tool Show, Chicago, Booth 648.

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figure by £17.0 million and the average for the first three months by £26 million.

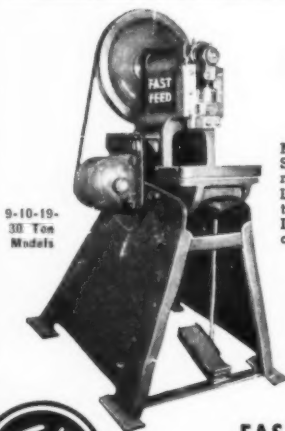
The value of retained imports in April (£140.4 million) was the highest figure recorded since July 1920. Food, drink and tobacco continued to represent more than half the total, the value (£70.6 million) being the highest on record. Retained imports of raw materials were the highest in value for 22 years, being £11.5 million above the average of the first quarter, while manufactures were up £4.7 million.

Re-exports in April were £6.7 million. Re-exports of rubber amounted to £2.5 million and those of wool to £1.6 million.

During the first quarter of 1947 exports to all areas were £17 million less than in the fourth quarter of 1946, the reduction to foreign countries being £11 million and to British countries £6 million. During the first quarter foreign countries took £122.7 million (or 49.1 per cent and British countries £127.0 million (or £50.9 per cent).

As in the previous quarter British India, The Union of South Africa, and Australia were our three largest markets, but Denmark fell from fourth to eighth on the list.

Total imports in the first quarter of 1947 were valued at £363.8



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Fast Feed Presses

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Compare these Production Features . . .

MORE PRODUCTION PER HOUR—Fingertip Variable Speed Control achieves 180 to 500 press strokes per minute.

LOW UPKEEP—Example: Replacement shaft for 18 ton press only \$40.00.

LOW PURCHASE PRICE—9 ton Fast Feed Press costs only \$315.00 (Immediate Delivery).

Compare these Construction Features . . .

BRONZE BEARINGS running from front to rear.

FLYWHEEL out of operator's working space, SKF Ball and Thrust Bearings.

MOTOR—Fingertip Control within easy reach.

CRANKSHAFT—can run in oil bath or grease at high speeds.

DIE SPACE—more provided than in conventional types.

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More Production Per Hour

million £6 million less than in the fourth quarter of 1946. Imports from British countries were £12 million lower than in the previous quarter and those from foreign countries £6 million higher. Of the total £197.1 million or 54.2 per cent came from foreign countries. Imports from North America (£115.7 million) represented almost one third of the total.

The value of imports from hard currency areas (£173.3 million) was £3.6 million higher than in the preceding quarter while those from other areas fell £9.6 million to £190.5 million. Total exports to hard currency areas (£56.9 million) rose by £1.0 million and those to other areas fell by £13.2 million to £211.0 million. The excess of imports over exports in trade with hard currency areas has arisen from £109.0 million in the third quarter of 1946 to £116.4 million last quarter. Exports to other areas exceeded imports by £34.9 million in the third quarter, this excess being reduced to £20.5 million last quarter. The proportion of exports going to hard currency areas has been rising and last quarter equalled that in 1938. Much higher proportion of our imports continues to come from hard currency areas, nearly one half as against one third before the war.

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The Lewis Magnetic Base permits instant convenient attachment of your dial or height gauge to lathes, milling machines, surface or cylindrical grinders, shapers, planers or wherever needed without clamps or special attachments.

The Lewis Magnetic Base has countless other uses. It will hold work in position on surface plates for layout, and supplies magnetism to wands for chip removal from drilled holes. Many owners have also reported using it as a small magnetic chuck for light work.

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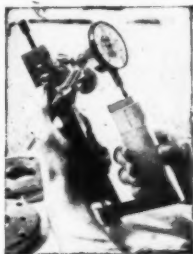
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PRECISION MEASUREMENT



By
**WARREN
BAKER**

Section II—Instrument Inspection, Cont'd.

Part 13—Measurement of Threads and Gears

When the National Screw Thread Commission established the American National form of thread in 1928, fourteen standard threads were adopted, fitting various purposes. The commission also recognized and gave standard ratings to several foreign threads, particularly the Whitworth (English) and the Lowenherz (German) forms.

Most important of these have the following standard designations: N. C.—The American national coarse thread series, once known as the U. S. Standard; N.F.—the American national fine thread series, once known as the S.A.E.; N.—the American national, 8-, 12-, and 16-pitch series; N.E.F.—the National extra fine; N.S.—National special series; N.H.—National hose coupling threads; N.P.T.—National taper pipe threads; N.P.S.—National straight pipe threads; V.—A 60° V-thread, usually having the crest and root flattened to the user's specifications; Acme—a standardized 29° thread; and a number of others, including those for grease, steam and conduit fittings, stove bolts, and square, and buttress threads.

The forms of a number of these are shown in Fig. 1. All NC, NF, N, Metric and V threads have the same thread angle, 60°. Acme and worm threads have a 29° angle; the Whitworth a 55° angle and the Lowenherz one of 53' 8". There

are also worm threads with a 40° angle, but they are always so designated. The metric thread is the same as the National, except measured by the metric system. It is used chiefly in this country for spark plugs. Principle use of the buttress thread is for breech blocks on artillery and for presses and jacks.

The various measurements and elements of thread and gear terms are shown graphically in Fig. 2.

Glossary

Angle of Thread—Is the angle included between the sides of the thread when measured in an axial plane. It is always designated by the letter *A*. Half the angle is designated by the letter *a*. The name of the thread tells you the angle to which it is supposed to conform.

Pitch—Is the distance from a point on the screw thread to a corresponding point on the next thread when measured parallel to the thread axis. It is always shown by the letter *p* and is

quickly found by this formula: $p = \frac{1}{n}$
where *n* is the number of threads to an inch.

Base—Is the bottom section of a thread; i.e., the greatest section between two adjacent roots.

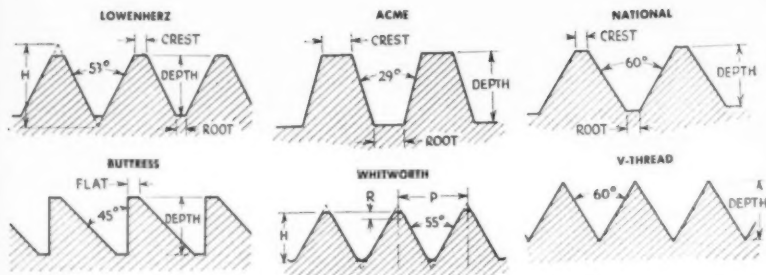
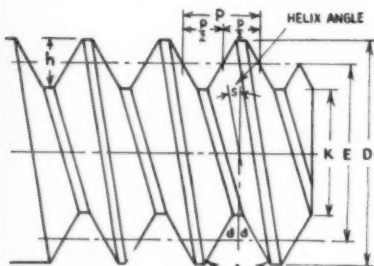


Fig. 1—The principal types of thread forms.



Fig. 2—The elements of a screw thread.



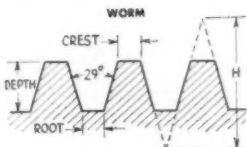
Root—Is the bottom surface joining the sides of two adjacent threads.

Crest—Is the top surface joining the two sides of a thread.

Depth—Is the distance between the top or crest (in profile) and the base or root, measured perpendicular to the axis.

Helix Angle—Is the angle made by the helix of the thread at the pitch diameter with a plane perpendicular to the axis. It is represented by the small letter s . The tangent of the helix angle is shown as the large letter S .

Lead—Is the distance a thread advances axially in one turn. On a single thread the lead and the pitch are the same, but not otherwise.



The principal types of thread forms.

Major Diameter—Is the largest diameter of the screw or nut or gear. It is represented by the letter D . It is also known often as the outside diameter and is the diameter which designates the size of the part. For instance a $\frac{3}{8}$ "-20 screw would be one having a major or outside diameter of $\frac{3}{8}$ " and 20 threads to the inch of length.

Minor Diameter—Is the smallest diameter of a screw or gear. On a nut it would be the same as the tap drill size. It is represented by the letter K .

Pitch Diameter—Is the diameter where the thread thickness is equal to the space between the threads, whether of screws, gears, splines or worms. If the flats at the top and bottom of the thread are the same, the pitch diameter will coincide with the middle of the sloping side of the thread. It is often represented by the letter E . The formulae: $E = D - h$ (depth of thread) or

$E - D$ —Twice the addendum (in the case of Acme threads, gears and worms.)

Number of Threads—Is the number of threads or teeth in 1 inch of length.

Side of Thread—Is the surface which connects the crest with the root.

External and Internal Threads—Are threads on the outside of a member (external), such as threaded plug gage; or threads on the inside of a member (internal) such as a threaded hole or ring.

Axis—Is the longitudinal center line.

Length of Engagement—Is the length of contact between two mating parts, measured axially.

Thickness of Thread—Is the distance between the adjacent sides, measured along or parallel to the pitch line.

Measurement With 3 Wires

Because it is generally used and recommended by The Bureau of Standards as the best means of insuring uniformity, the three-wire method of measuring screws and most gears will be explained at some length. If accuracy only to thousandths is required, the measurement can be done with a micrometer. If accuracy to tenths is required, a dial gage setup may be used.

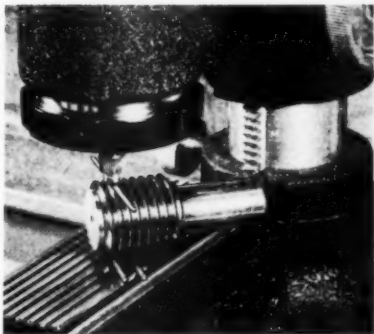


Fig. 3—Setup of a master thread plug for measurement on the comparator by the three-wire method.

For accuracies of hundredths of thousandths of an inch, however, an electric comparator or the optical flat method is recommended. Fig. 3.

The three-wire method calls for use of three wires, which are available in

Photo A Setup for three-wire measurement with the Pratt & Whitney bench micrometer. The measuring wires in this case are Carboloy tungsten carbide. (Courtesy Lincoln Park Industries, Detroit.)



standard accurate sizes from many manufacturers, coming usually three wires of a size in a suitable container. The system is recommended by the Bureau of Standards because the resulting pitch diameter measurement by this method is least affected by any error that may be present in the included angle of the thread. It is possible to measure the included angle also by this method, as will presently be shown in considerable detail, with formulae and equations.

How to Make Setup

The wires are placed two on one side of the thread or thread gage and one on the opposite side, all as close together as possible for convenience under the micrometer, dial gage, or comparator spindle. If optical flat or comparator measurement is used, the two threads should be placed on the bottom flat and the single one on top.

In this case the bottom wires need not occupy adjacent threads. One pound of pressure should be put on the spindle in measuring parts with fine thread, and 2 pounds or more for the larger types. (Photo A).

Any size wire may be used so long as it does not drop so deeply into the thread that its top comes below the top of the thread. The ideal size wire, however, is one that touches the sides of the thread at the pitch line. If you are using regular measuring wires, which is best because they are hardened and sized to definite standards, a constant will be shown on the container for each set, thus placing the whole method of measurement in the field of simple arithmetic. The method of finding the pitch diameter of a screw then, is this:

Suppose you have a 1"-8 thread gage to check. You set it up in the comparator as detailed earlier and find the measurement over the wires (always designated as M) is 1.0272". From the

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4	3¾x16	8	3	8	8

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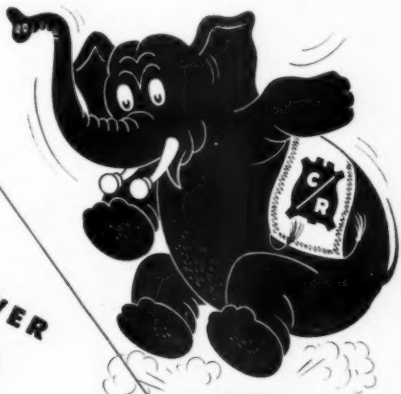
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label on the wires container you learn the constant is .10826". The measured pitch diameter then is M—the constant, or .91894". But the basic pitch diameter for this type of screw, which you can find from the tables in any good machinist's handbook is .9188" (reduced to the nearest ten-thousandth). So the thread gage you are measuring is .00014" oversize.

How to Find P D

The proper pitch diameter can be found, if you have no tables, by subtracting the depth (h) from the basic outside or major diameter.

But even if you do not know the constant of the best wire, you can still measure the pitch diameter. It calls for some trigonometry, but standard tables of natural or log functions will do most of the work for you. G is the diameter of the best wire size:

$$\text{Formula: } G = \frac{\sec a}{2n}$$

In the case of 60° threads this becomes $G = \frac{.57735}{n}$ or .57735p

$$\text{For } 55^\circ \text{ threads } G = \frac{.563692}{n} \text{ or } .563692p$$

$$\text{For } 53^\circ 8' \text{ (Lowenherz threads), } G = \frac{.55902}{n}$$

$$\text{For } 47\frac{1}{2}^\circ \text{ threads, } G = .54625p$$

$$\text{For } 40^\circ \text{ threads, } G = .5321p$$

$$\text{For } 29^\circ \text{ threads, } G = .51645p$$

Then, knowing the best wire size from the above formulas or standard constants, the general formula for measuring the pitch diameter of all symmetrical threads, using any size of wires that will fit in the threads is:

$$(1) E = M + \frac{\cot a}{2n} - G(1 + \operatorname{cosec} a)$$

$$GS^2 \\ - \frac{\cos a \cot a}{2}$$

In equation (1) $\frac{\cot a}{2n}$ is the depth of a sharp V thread.

(1 + cosec a) is a wire factor which, when multiplied by the diameter of the wire (G), gives twice the dimension from the top of the wire to the bottom of a sharp V thread: (Values of 1 + cosec a are given in Table I) GS²

— cos a cot a is the helix angle correction, which is the amount the wires are raised above a position in a straight groove, due to the helix of the thread. This is usually ignored. On all standard fastening screws it is less than .00015".

Neglecting the helix angle correction, then, equation (1) becomes:

$$(2) E = M + \frac{\cot a}{2n} - G(1 + \operatorname{cosec} a) \text{ or}$$

$$(3) E = M - \left(G(1 + \operatorname{cosec} a) - \frac{\cot a}{2n} \right)$$

For a given set of best wires of diameter (G) which are used for a given number of threads per inch (n), the term $G(1 + \operatorname{cosec} a) - \frac{\cot a}{2n}$ does

not change and can be computed once and for all as a best wire constant (W).

For 60° threads, where: cot a = cot 30° = 1.73205, and cosec 30° = 2.0000, equation (3) reduces to:

$$(4) E = M - \left(3G - \frac{.86602}{n} \right) \text{ or}$$

$$(5) E = M - W, \text{ where } W = \left(3G - \frac{.86602}{n} \right)$$

For 60° threads the depth of a sharp V thread equal 3G except in some fifth

VALUES OF THE COSECANT $a + 1$ FOR MEASURING THE INCLUDED ANGLE OF THREADS

29° Threads		40° Threads		55° Threads		45° Threads		47 1/2° Threads	
Angle	Result	Angle	Result	Angle	Result	Angle	Result	Angle	Result
27°	5.2836	58°	3.0627	53°	3.2411	43°	3.7285	45°—30'	3.5859
27°—10'	5.2579	58°—10'	3.0573	53°—10'	3.2346	43°—10'	3.7185	45°—40'	3.5770
27°—20'	5.2324	58°—20'	3.0519	53°—20'	3.2282	43°—20'	3.7085	45°—50'	3.5681
27°—30'	5.2072	58°—30'	3.0466	53°—30'	3.2217	43°—30'	3.6986	46°	3.5593
27°—40'	5.1824	58°—40'	3.0413	53°—40'	3.2153	43°—40'	3.6888	46°—10'	3.5506
27°—50'	5.1578	58°—50'	3.0360	53°—50'	3.2090	43°—50'	3.6791	46°—20'	3.5419
28°	5.1336	59°	3.0308	54°	3.2027	44°	3.6695	46°—30'	3.5333
28°—10'	5.1096	59°—10'	3.0256	54°—10'	3.1964	44°—10'	3.6599	46°—40'	3.5247
28°—20'	5.0859	59°—20'	3.0204	54°—20'	3.1902	44°—20'	3.6504	46°—50'	3.5163
28°—30'	5.0625	59°—30'	3.0152	54°—30'	3.1840	44°—30'	3.6410	47°	3.5078
28°—40'	5.0394	59°—40'	3.0101	54°—40'	3.1778	44°—40'	3.6316	47°—10'	3.4995
28°—50'	5.0165	59°—50'	3.0050	54°—50'	3.1717	44°—50'	3.6223	47°—20'	3.4912
29°	4.9939	60°	3.0000	55°	3.1657	45°	3.6131	47°—30'	3.4829
29°—10'	4.9716	60°—10'	2.9950	55°—10'	3.1596	45°—10'	3.6040	47°—40'	3.4748
29°—20'	4.9495	60°—20'	2.9900	55°—20'	3.1536	45°—20'	3.5949	47°—50'	3.4666
29°—30'	4.9277	60°—30'	2.9850	55°—30'	3.1477	45°—30'	3.5859	48°	3.4586
29°—40'	4.9061	60°—40'	2.9801	55°—40'	3.1418	45°—40'	3.5770	48°—10'	3.4506
29°—50'	4.8848	60°—50'	2.9752	55°—50'	3.1359	45°—50'	3.5681	48°—20'	3.4426
30°	4.8637	61°	2.9703	56°	3.1300	46°	3.5593	48°—30'	3.4347
30°—10'	4.8428	61°—10'	2.9654	56°—10'	3.1242	46°—10'	3.5506	48°—40'	3.4269
30°—20'	4.8222	61°—20'	2.9606	56°—20'	3.1185	46°—20'	3.5419	48°—50'	3.4191
30°—30'	4.8018	61°—30'	2.9558	56°—30'	3.1127	46°—30'	3.5333	49°	3.4114
30°—40'	4.7816	61°—40'	2.9510	56°—40'	3.1070	46°—40'	3.5247	49°—10'	3.4037
30°—50'	4.7617	61°—50'	2.9463	56°—50'	3.1014	46°—50'	3.5163	49°—20'	3.3961
31°	4.7420	62°	2.9416	57°	3.0957	47°	3.5078	49°—30'	3.3886

Table 1—Values of cosec $A + 1$ for Measuring the included Angle of Threads.

decimals, where computations may be off by a hundred thousandth or so.

To lighten the labor of these computations somewhat, the formulae in Table II for various types of threads will be found useful.

It should be noted in the table that the addendum of 29° and 40° worm

threads is $\frac{.3184}{n}$ and that the thread depth of $\frac{.6866}{n}$ provides a clearance of

$\frac{.05}{n}$ at the bottom of the thread. G can be any size wire that will fit in the thread, without dropping below the crest. Helix angle corrections are not considered in the table.

How to Use Formula

Let us put all these matters to practical use in a specific problem. We will suppose we have a $\frac{3}{4}$ "—10 thread gage, which we wish to measure with best size wires of .05774" diameter. The wire constant, then is $3 \times .05774 = .08662$, or .08662". The measurement over the wires is found to be .7071". Since $E = M - W$, or .68348" and, from the standard tables, we know the basic pitch diameter of a $\frac{3}{4}$ "—10 screw is supposed to be .6850", by subtraction we find the thread gage is .00152" undersize.

Now, suppose we have to use wires that are .09623" (6 pitch) in diameter and the measurement over the wires proves to be .8865". From equation 4 we know that $E = (3G - \text{the depth of a sharp V thread, or .08660"})$, so $E = .8865" - .20209" = .68441"$. But the basic

	Included Angle	Thread Depth	Formula for Pitch Diameter
National	60°	$\frac{.649519}{n}$	$E = M - \left(3G - \frac{.86602}{n} \right)$
National Pipe	60°	$\frac{.8}{n}$	$E = 1.00049 M - \left(3G - \frac{.86602}{n} \right)$
Sharp V	60°	$\frac{.86602}{n}$	$E = M - \left(3G - \frac{.86602}{n} \right)$
International Metric	60°	$\frac{.649519}{n}$	$E = M - \left(3G - \frac{.86602}{n} \right)$
Whitworth	55°	$\frac{.64033}{n}$	$E = M - \left(3.16568G - \frac{.96049}{n} \right)$
British Association	47½°	$\frac{.6p}{n}$	$E = M - \left(3.4829G - \frac{1.13634p}{n} \right)$
Lowenherz	53°8'	$\frac{.75p}{n}$	$E = M - \left(3.23594G - \frac{p}{n} \right)$
Acme Screws	29°	$\frac{.1}{2n} + \frac{.010''}{n}$	$E = M - \left(4.9939G - \frac{1.93334}{n} \right)$
Acme Taps	29°	$\frac{.1}{2n} + \frac{.020''}{n}$	$E = M - \left(4.9939G - \frac{1.93334}{n} \right)$
29° Worm	29°	$\frac{.6866}{n}$	Use wire $\frac{.5149}{n}$ to come flush with top of thread.
40° Worm	40°	$\frac{.6866}{n}$	Use wire $\frac{.51234}{n}$ to come flush with top of thread.

Table II—Formulas for Measuring Threads of Various Forms.

• • •

PD of the ¾"—10 thread is .6850", so by subtraction we find the thread is .00059" undersize.

It will be noted at once that there is a sizable variation between the measurements as discovered by using the best wire size and those found with 6 pitch wires. If your measurements and calculations are correct, they should be the same, or so nearly as to check for all practical purposes.

The thing to do is to try it again and if you get the same or nearly the same

answer the second time, there is only one explanation. The included angle of the thread is less than 60°. If your answers varied on the oversize instead of the undersize side, it would show that the included angle is more than 60°. And that brings us to the point of measuring the included angle by the three-wire method.

Formula for Angle

To do this, two sizes of wires are used. It is best to choose wires as near as possible to the maximum best wire for

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G₁. These you can find readily from standard best wire tables. Then, the general formula for determining the included angle of a thread is:

$$(1) \operatorname{cosec} a = \frac{M_1 - M_2}{G_1 - G_2} - 1$$

or

$$(2) \frac{M_1 - M_2}{G_1 - G_2} = \operatorname{cosec} a + 1$$

Where: M₁ = Measurement over the 3 large size wires of dia. G₁.

M₂ = Measurement over the 3 small size wires of dia. G₂.

For a thread exactly 60°, the half angle (a) being 30°, cosec a = cosec 30° = 2.0000, and equation (2) becomes:

$$(3) \frac{M_1 - M_2}{G_1 - G_2} = 2.0000 + 1 = 3.0000$$

To put the foregoing to a practical example, let us suppose that we are still working with that 3/4"-10 thread

gage, where we found that M₁ was .8865" with the 6 pitch wires and M₂ was .7701 with the best size wire. Substituting in equation 2 we get cosec (a)

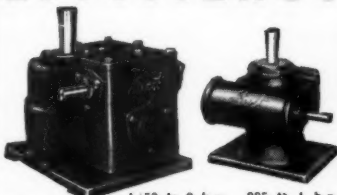
$$+ 1 = \frac{.8865 - .7701}{.09623 - .05774} \frac{.1164}{.03849} = 3.0242,$$

and, referring to the table of values for the cosecant of + 1, we find that 3.0242 is the result for an angle between 59°10' and 59°20'. By interpolation, we find the angle is 59°12'42", approximately.

Measuring With Flush Wires

Although the use of flush wires does not take into account the correction for helix angle, which in the case of multiple threads may be of significance, flush wires have been used so long for the measurement of 29° Acme threads and 40° worms that a change in the method now would amount to setting up a new standard that would cause difficulties in interchanging with established machines and parts. Since this is

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the practice of the majority, the method is given consideration here. It should be noted that the term "flush" wires is somewhat of a misnomer. Actually the wires are flush with the top of the tap thread, not the screw. In fact, they project about .020" (diameter) above the screw thread.

The common method is to measure the outside diameter of the thread with a micrometer, dial gage, gage blocks, or comparator and note its dimension. Then one wire is placed in the thread and the amount it is above or below the major diameter measured with the same instrument. If the wires project much above the crest, three wires should be used.

It often happens that the major diameter of an Acme tap or worm has been finished oversize, which will cause the "flush" wires to drop below the crest. In that case, the next larger size of wires should be used. In the 29° thread, the oversize wires will be higher up in the thread about 2½ times the amount they are oversize, instead of 3 times as in previous examples. On a full diameter measurement, then, the M measurement will be about 5 times the amount the wires are oversize. If the wires are not oversize more than .005", the answers will be correct within .0001". If greater accuracy is required, you will have to substitute in the formulas previously given.

Measuring External Gears

The same general principles which have been applied in the foregoing to screws and taps will be found to apply equally well to the measurement of most forms of gears. See Fig. 5. For external spur gears with an even number of teeth, two wires are used as nearly opposite each other as possible. The system of measurement is based on tabular computations done by Dr. C. H. Havill and his staff for the Eclipse Aviation Corporation of Bendix, N. J. The original tables were complete to

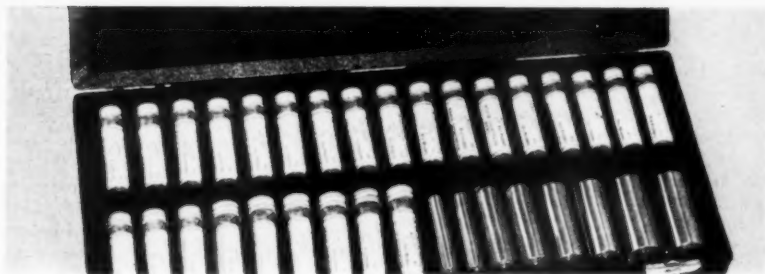


Fig. 4—A complete set of standard measuring wires and pins. (Courtesy the Van Keuren Co., Watertown, Mass.)

• • •

gears with 500 teeth, and may be found entire in "Precision Measuring Tools," published in 1945 by the Van Keuren Company of Watertown, Mass. Shorter tables, giving the most common sizes, may be found in "Science of Measure-

ment," Book 7, published the same year by the DoAll Trade School, Des Plaines, Ill. The original tables include gears with pressure angles of $17\frac{1}{2}$, 25, and 30° in addition to the common ones of $14\frac{1}{2}$ and 20° . It is unfortunate that the com-

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plete tables are too lengthy to be published here.

An example would be an external gear with 26 teeth (even) and diametral pitch of 12. (The diametral pitch is the number of teeth per inch of pitch diameter.) The pressure angle is $14\frac{1}{2}^\circ$ and we are using .144" diameter wires. From the tables, we find the measurement for a diametral pitch of 1 is 28.4315", so for a DP of 12, the measurement over the wires should be 28.4315 divided by 12, or 2.3693". If the actual measurement were 2.3669", for instance, the pitch diameter of the gear is 2.3693" — 2.3669" = .0027" undersize.

Now, if the gear were one with 35 teeth (odd) and had a DP of 16 and a 20° pressure angle, we would measure with .018" wires. But, when placed in the teeth, the wires are not diametrically opposite by half a tooth. By the use of the tables, however, the two wire

measurement is still possible. From the table, in this case, 1DP is 37.3802, so for 16 DP the wire measurement M is 2.3363".

Measuring Internal Gears

For internal spur gears, the same methods apply. If you had a 51 tooth gear with a DP of 8 and a 20° pressure angle, you would measure with .180" diameter wires and you would find again the wires were half a tooth away from being diametrically opposed. But from the table you learn the measurement between the wires for 1DP is 49.6409", so for 8 DP, it is 6.2051".

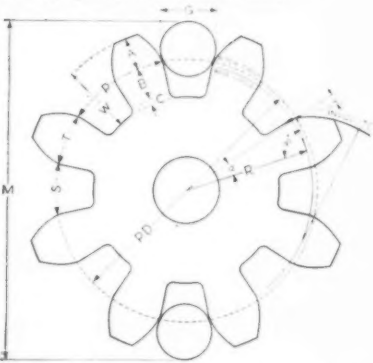
It should be remembered that the general formula is always $G = \frac{1.728''}{DP}$ for external gears and $G = \frac{.144''}{DP}$ for

internal gears, so if no tables are available, the computations may still be made, but at the expense of some mathematical toil.

The measurements over the wires given in the tables are for theoretical

• • •

Fig. 5—Elements of the involute gear. (Courtesy the Van Keuren Co.)



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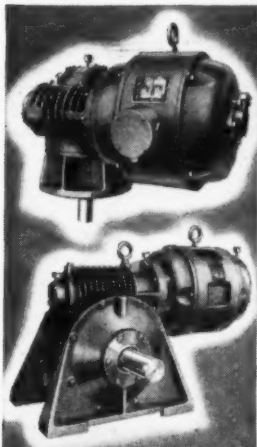
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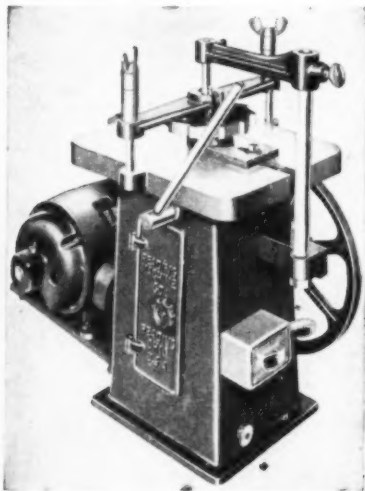
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The Reading Bench Machine does not require bushings or guides. No other machine like it. Very fast — capacity from $\frac{1}{8}$ to $\frac{3}{8}$ cutter. Low first cost — prompt delivery.

READING MACHINE CO.
READING (CINCINNATI) OHIO

standard size, without allowance for backlash. The amount of play or backlash is often specified in a pair of mating gears to insure that the gears operate at their proper distances. It is provided by reducing the pitch diameter or, what amounts to the same thing, cutting the teeth a little thinner. It may be divided equally between the mating gears, or, in the case of small pinions, all be put into the larger gear. To allow for this in your measurements, the following formulas will prove helpful. R is the amount of reduction in the wire measurement to provide for the BL, backlash, specified. So, for a $14\frac{1}{2}^\circ$ pressure angle, $R = 2BL$ if the backlash is distributed evenly, and $R = 4BL$ if all the backlash is given to one gear. The amount the teeth would be thinned in this case to allow for backlash would

$$R \\ \text{be } \frac{1}{4}$$

For a 20° pressure angle, $R = 1.46 BL$ on two gears and $2.92 BL$ if on one, and t , the amount the teeth are cut thin,

$$R \\ \text{would be } \frac{1}{2.92}$$

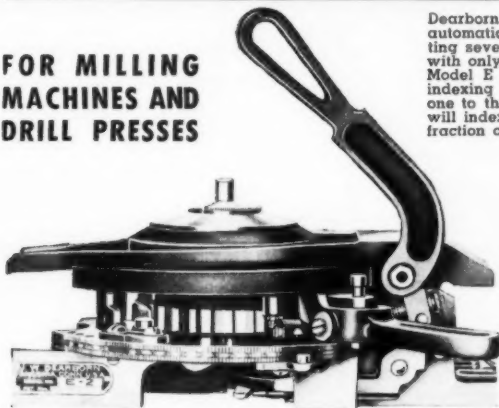
The complete formulae for measuring all types of spur gears without the tables can be found in Buckingham's "Manual of Gear Design," as approved by the American Gear Manufacturer's Association, by those who wish additional information on this method of measurement.

Measuring Helical Gears

Helical gears present a number of complications not present in the measurement of spur gears. These are chiefly the result of different methods of manufacture: milling, hobbing, shaping, or nowadays, compacting and sintering of powdered metals. Some of these varying methods often cause helical gears to differ from the true involute form. Most authorities agree, however, that the method of measuring

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MACHINES AND
DRILL PRESSES**



Dearborn fixtures meet every demand for automatic chucking and indexing, permitting several operations on the same piece with only one setting.

Model E is both a degree and a ratchet indexing fixture. It may be changed from one to the other in less than a minute. It will index any number of degrees or any fraction of a degree. Two adjustable stops are provided so that two angles can be obtained if necessary.

Work is held by collets which take up to and including 1" round, $\frac{7}{8}$ " hexagon and $\frac{3}{4}$ " square. Other shapes can be held with special collets.

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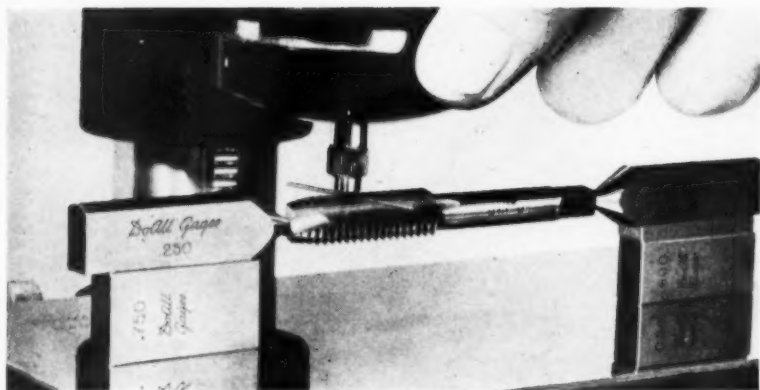


Fig. 6—Setup on the comparator for one-wire measurement of top threads. Elements are shown in the small drawing.

• • •

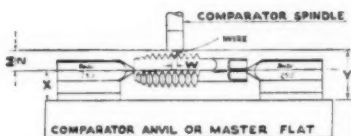
them with wires is preferable to measuring with balls, because wires are available in a wider variety of sizes.

To measure with two wires, a master gear or a master dimension should first be set up on the comparator. This dimension should be the theoretically correct dimension over the wires. By comparison, then, it is possible to inspect the gear by the following formulas and example:

We will suppose a helical gear with 12 teeth (n); a diametral pitch of 6, a pitch diameter of 2 inches; a helix angle of 45° and a pressure angle of $14\frac{1}{2}^\circ$. We know from standard trigonometrical tables that the cosine of 45°

is .70711; that $\frac{1}{\cos 45^\circ}$ is 1.4142, and

that $\frac{1}{(\cos 45^\circ)^3}$ is 2.828. The formula for



1.728
wire size is $\frac{1.728}{\text{Normal DP}}$

- 1) Then, to find the normal DP:

$$\frac{6}{\cos 45^\circ} = 6 \times 1.4142 = 8.4852$$

- 2) To find wire diameter:

$$\frac{1.728}{\text{Normal DP}} = \frac{1.728}{8.4852} = .20377''$$

- 3) To find the number of teeth (N') in an equivalent spur gear:

$$\frac{12}{\cos 45^\circ} = 12 \times 1.4142 = 16.9704$$

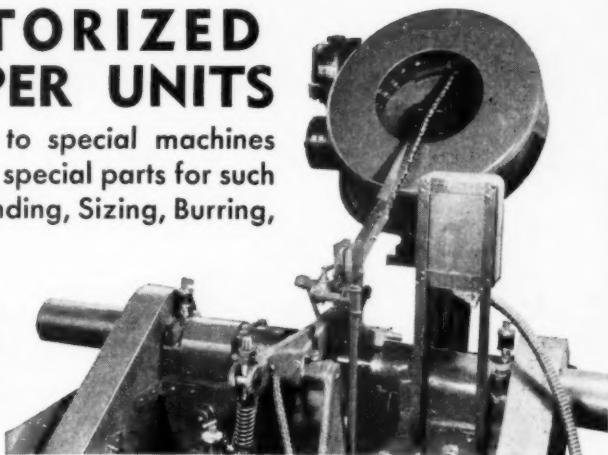
- 4) To find the number (n) of teeth for which a cutter would be selected:

$$\frac{12}{(\cos 45^\circ)^3} = 12 \times 2.828 = 33.94$$

MOTORIZED HOPPER UNITS

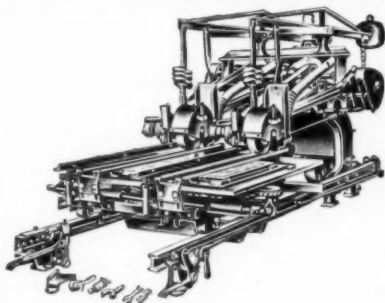
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HERE IS A
Machine
FOR
GRINDING and POLISHING
Stove Tops
Auto Bumpers
Electric Irons
AND
Other Products

- 5) To find measurement for 1DP =
M, use decimal from table for 34
teeth (nearest whole number to
33.94, or .4526"
18.9704"

$$\text{Add } N^1 + 2 = \frac{\quad}{M} = 19.4230"$$

- 6) To find M for given helical gear:
M 19.4230

$$\frac{\quad}{\text{Normal DP}} = \frac{19.4230}{8.4852} = 2.2890"$$



CUB

VARIABLE SPEED TRANSMISSION

For "A" section V-belts—3.3—1
speed range—perfect belt align-
ment in all positions. Priced so low
that no shop or machine need go
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Write for descriptive literature and prices.

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45 E. Stroop Rd. Dayton 9, Ohio

and that answer is the theoretically
correct measurement over the wires
for the given gear. It may seem a long
way around, but helical gears are far
from simple products.

The foregoing formula and method
are for helical gears with an even num-
ber of teeth. For those with odd teeth,
proceed as before but correct the result
by this formula:

$$M \text{ (for odd number of teeth)} = (M - \cos. 90^\circ$$

wire dia.) $X \frac{\quad}{n} +$ the wire di-

ameter. Use the even table for both
even and odd number of teeth and in-
terpolate the decimal for the nearest
whole number of n.

Measuring With One Wire

A special setup for measuring the
pitch diameter of a three- or five-fluted
top with comparator (or dial gage),
gage blocks, and center points is shown

M
in Fig. 6. Here $\frac{\quad}{2}$ is one half the M used

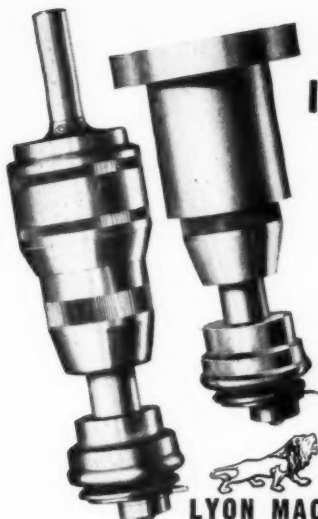
for three-wire measurement; X is the
height totaled by gage blocks and center

2
points, while $Y = \frac{\quad}{M}$, or the height at

which to set the comparator. The 3 wire
formulas then, apply.

*(The author wishes to acknow-
ledge with thanks the permission of
the DoAll Company, Des Plaines, Ill.,
to use much material in this install-
ment prepared for and published by
the DoAll Trade School under the
title "Science of Measurement";
also his thanks to the Van Keuren
Co. of Watertown, Mass. for ex-
amples, tables, and illustrations.)*

When foreign matter enters your bear-
ing it immediately begins to cause ex-
cess wear on the microscopic smoothness
of the working surfaces. Once wear starts,
the fragments of metal spalled off speed
up wear and presently the surfaces of
the races and balls are destroyed.

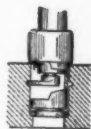


The Lyon INTERNAL GROOVING TOOL

Its versatility saves costly preparation time—provides precision grooving of single or multiple grooves at a production rate—plus economy of set-up time—and low initial cost. The LYON has been designed for making internal grooves to tolerances of .001" using any drill press, turret lathe, radial drill or automatic equipment.

By changing only bushings and cutters within the tool model range, you have at your command a wide variety of bore sizes and shapes. A simple adjustment regulates location and depth of groove. Work cannot be scratched or marred because the head of the tool does not turn when the cutter operates.

Our Engineering Department will welcome the opportunity of discussing any grooving problem without obligation.

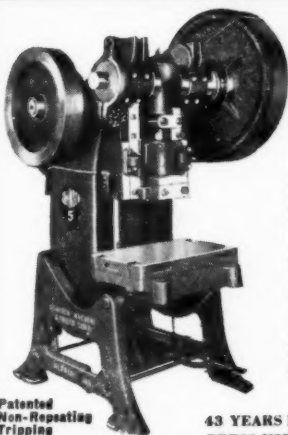


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LOCATED FROM
BOTTOM OF
HOLE



SINGLE GROOVE
LOCATED FROM
TOP OF HOLE

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Much larger die space than average presses. Engineered and designed for unlimited peak production.

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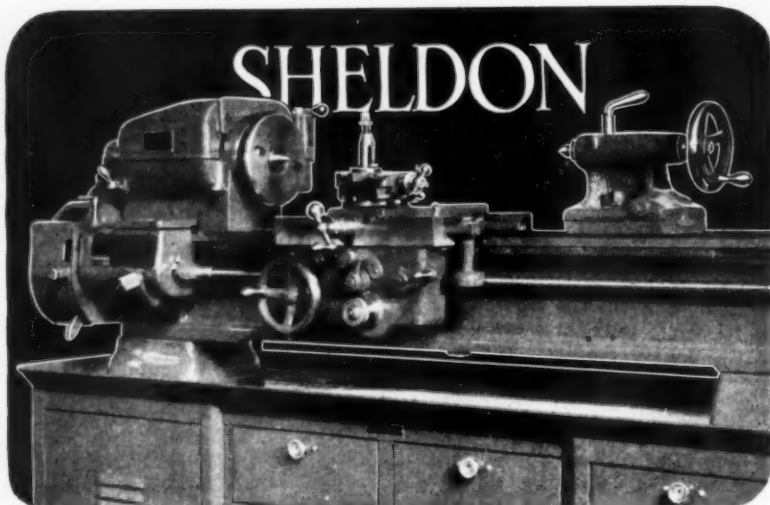
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Production Capacity

---comes ready for production

The new TRB-S56 Sheldon Precision Lathes have the speed, stamina and capacity for general production use—11¼" swing, 1⅜" hole thru spindle, 1" collet capacity. They will operate safely at high speed and work to the very closest tolerances, for spindle bearings are "Zero Precision" tapered roller bear-

ings, the most accurate obtainable.

They will take a "healthy cut" too, because they have double V-belts to the spindle to assure full power from their 1 h.p. motor at the point of work. They come ready for production—no breaking-in period is required—start earning from the day received.

Write for Catalog of Sheldon and Sheldon-Vernon.

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Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers
4242 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.

WHAT'S NEW IN METALWORKING

ALL-PURPOSE ELECTRIC IMPACT TOOL

Ingersoll-Rand announces a new, universal electric all-purpose Impact Tool, designated as the Size 4U. With a weight of 6½ lbs. and an overall length of 10½", the unit has a free speed of 2000 rpm, and delivers 1900 rotary impacts per minute under load. It is powered with a reversible, universal 3-amp. electric motor, operating on 110 Volt, AC-DC current.

The Impact Tool runs as any conventional electric tool until the resistance to spindle rotation reaches a specific amount,

The following operations can be performed by the Impact Tool using standard attachments: the unit is rated to apply and remove nuts and cap screws up to ¾" thread size. It is rated for ¼" drilling in metal, and up to ½" by step drilling. It will admit reamers up to ½" diameter, and taps from ¼" to ½". All types of machine screws up to ¾" thread size, as well as studs up to ¾" thread size, and wood screws up to size 20 can be driven or removed by the Model 4U. The unit will



after which a patented mechanism converts the power of the motor into "rotary impacts" which exert a more powerful turning effect.

An advantage of the impact mechanism permits the spindle to be stalled completely while the motor continues to run, thus eliminating motor burn-outs caused by overloading. The impact mechanism also eliminates torque reaction to the operator; there is no kick or twist under any operating conditions.

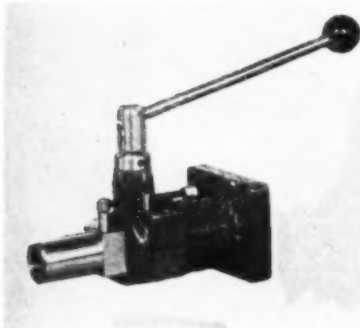
extract broken cap screws and studs up to ¾" thread size.

Further uses of the accessory include the running of various types of wire brushes with round shanks up to ¾" diameter. It will do wood boring with twist drills up to ¾", with a collet-type chuck, and up to 29/32" with a Morse Taper.

The 4U all-purpose tool is a product of the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

SUDBURY DEVELOPS TURRET ATTACHMENTS

Sudbury Manufacturing Co., makers of precision machine parts, announce five new models of their sensitive turret attachment for different sizes and types of



turret lathes, two of which are also applicable for engine lathe tail stocks. The manufacturers claim that these attach-

ments are a basic improvement in machining methods, allowing the lathe operator sensitive finger-tip control of his tools at all times. The use of this accessory does away with the need of the tail stock hand wheel for most operations, thus cutting down on set-up time; it greatly eliminates tool breakage and work spoilage.

The new type attachments, designated as No.'s 101B through 101F, are of various sizes, designed to fit specific turret lathes. No. 101C, illustrated, is for smaller saddle type and the largest ram type turret lathes. The flange for holding attachment to the turret face is placed at the back end of the body casting. Ram is 2" square, and 9½" long, giving 4½" of travel. Additional information and quotations are obtainable from the Sudbury Manufacturing Co., Dept. BB, Sudbury, Mass.

SPHERICAL SELF-ALIGNING BEARING

Adel Precision Products Corporation announces the new Halfco Spherical Self-Aligning Bearing. The unique design of this product makes it adaptable for a variety of applications, such as a rod end bearing, rotation bearing, static and self-aligning bushing, etc.

The Halfco Bearing consists of two



LINLEY

FOR NOISELESS, HIGH SPEED RIVETING

Rotary spinning principle shapes uniform heads, silently . . . capacities up to 3/8 inches diameters. Adjustable spindle stroke, controlled pressure . . . double row radial thrust bearing supports spindle, assures long life. Table elevating screw prevents slipping. Six floor or space-saving bench models . . . sturdily built for trouble-free operation under severe production schedules.

FOR COMPLETE INFORMATION, WRITE FOR BULLETIN.

**LINLEY BROTHERS CO., 663 STATE ST. EXTENSION
BRIDGEPORT 1, CONNECTICUT**

pieces; the outer race is of hard bronze, integrally formed around a hardened, polished, precision ground steel ball. The bearings may be fabricated from a variety of metals, to meet specific installation requirements.

The Halfco Bearing allows the greatest possible misalignment; fully spherical surface contact permits heavy loading; it resists both axial and radial thrusts. Complete specifications are available from the Adel Precision Products Corp., Burbank, Calif.

ALL-ALLOY STEEL CENTERS ACCURATE WITHIN .0002"

The Ready Tool Co., manufacturers of machine tool accessories, announce the development of RED-E Standard Ball-Bearing Centers. Designed for use with high speed steel cutting tools, the new centers are available in both Shank, Ball, and Roller Bearing Types. New Departure double row, angular contact, pre-loaded precision ball bearings maintain smooth operation, and provide thrust capacity 1½ times the radial capacity.



The centers are of all-alloy steel construction, with a heat-treated spindle. Accuracy is held within .0002" with point zero. A labyrinth enclosure prevents entry of cutting oil or chips, as well as escape of lubricant. Full information is obtainable by writing for Bulletin 472 from the manufacturers, The Ready Tool Co., 555 Iranistan Ave., Dept. BB, Bridgeport 5, Conn.

Power Facing and Boring with ONE Tool Head

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- 1 All operations in one set-up.
- 2 For Jig Borer, Drill Press, and Milling Machine.
- 3 Power feed engaged and disengaged instantly.
- 4 Adjustment for boring made in increments of one-tenth.
- 5 Cutting bar takes any position in Tee Slot of Slide.
- 6 Power feed for facing assures smooth, uniform movement of tool across work.

One Week Delivery

Precision Constructed: feed screw and worm gear ground from solid; bronze feed nut and bushings.

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MODEL "D"
Slide Travel 1"
Boring Capacity 8".

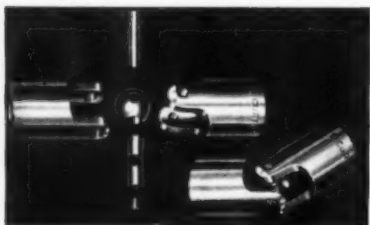
MODEL "H-D"
3 sizes of slide travel 2-1/2", 3-1/2", 4-1/2"
Boring Capacity 26".

CHANDLER TOOL CO.

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BALL-TYPE UNIVERSAL JOINT ELIMINATES FRICTION

To meet the demand for a light-duty universal joint, the Curtis Universal Joint Co., Inc., has developed a ball-type industrial universal joint. Utilizing a patented design, sliding friction is eliminated, and bearing friction is minimized, making the use of boots, covers, and excessive lubrication unnecessary, according to the manufacturers.



The forks of the ball-type joint are steel, and bear on a bronze ball, with centerless ground pivot bearing pins. The large pivot pin is provided with an oiler which enables proper lubrication to reach all

bearing points. The ball surface offers a minimum of friction loss, insuring long life for high-speed, light-load transmission, or for hand operated controls.

Two sizes, $\frac{1}{2}$ " and $\frac{3}{4}$ " are available, with larger sizes of 1" and $1\frac{1}{4}$ " shortly to be in production. For complete details, write Curtis Universal Joint Co., Inc., Dept. D, Birnie Ave., Springfield 7, Mass.

PROMPT DELIVERY ON BAKELITE BEVEL GEARS

With the installation of additional Gleason bevel gear equipment, the Greaves Machine Tool Co. is in an excellent position to give prompt delivery on complete bevel gears, or cutting teeth only, especially on sizes up to 12" diameter, 3 diametral pitch.

For eighteen years, Greaves has supplied the needs of industrial concerns cutting their own gears, with Bakelite (Phenolic) gear blanks, sawed to any diameter and face. Other gear items manufactured by this firm include Greavesilent Bakelite Gears and Pinions, which include a wide variety of industrial applications, especially where silent operation is necessary. These Bakelite Gears are impervious to dampness, and will operate successfully even when submerged in water.



FAST, ACCURATE SPACING

Graduated in thousandths, you have plus or minus .0005" at your fingertips with

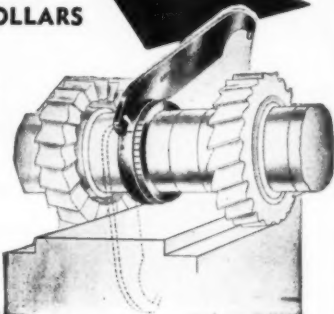
DAYTON ROGERS ADJUSTABLE SPACING COLLARS

You can make an accurate, positive adjustment just by loosening the cutter arbor nut and making adjustment as illustrated.

Made in 12 standards for cutter arbors from $\frac{3}{8}$ " to 2". Write for illustrated Bulletin 120-7.

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CUTTERS**
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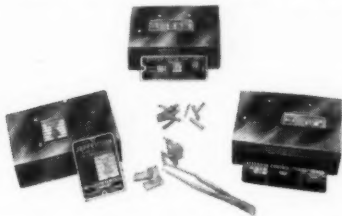


Inasmuch as these products are molded in one piece, there is not the danger of the Bakelite material separating into layers, which on previous non-metallic materials necessitated the use of rods and nuts to hold the laminations in a solid piece. By the use of Bakelite, the service life of the gears is prolonged; further, the gears tend to run smoother and quieter, made of this substance. Bakelite gears are especially recommended where the surface condition is comparatively light.

Greaves also furnishes silent gears of rawhide and Fabroil, and industrial gears of all metals. Additional information on Greaves Gears is available by writing to Dept. HM, Greaves Machine Tool Co., 201 Eastern Ave., Cincinnati 2, Ohio.

NEW TYPE CHASE FOR STAMPING DETAILS INTO METAL NAMEPLATES

With the use of this equipment, all details are stamped in a single operation. Perfect alignment, depth, and spacing are maintained, giving the nameplate a mechanically neat appearance. Each chase is made to fit the nameplate for which it is intended, since the recesses are registered with the blank spaces in the nameplate. Separate steel type, or logotypes, which have several characters engraved upon them, are dropped into the recesses. They are not fastened into place, and may therefore be quickly changed, if need be. Nameplates are laid



down against the gauge pins mounted on the spring mask plate. The flat platen in the press ram makes the impression. The steel type is available from this same source, and logotypes to expedite the setups where standard may be made to suite individual requirements. Further information on this product, which is designated as Item P11, will be furnished by Geo. T. Schmidt, Inc., 1802 W. Belle Plaine Ave., Chicago 13, Ill.

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3

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SHUR-GRIP HANDLES — The Cook 3-in-1 Hammer Mold is made expressly for extra safe COOK SHUR-GRIP handles!

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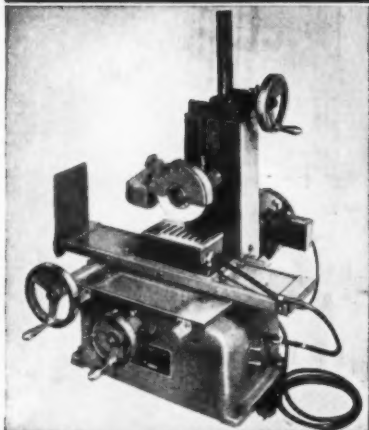
Handles (Shur-Grip) Mold and Ladles (single and 3-in-1 molds) Ready-Made Lead Hammers (in stock from 1 to 11 lbs.)

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A sensitive machine built to rigid standards of accuracy and workmanship specially designed "For the job that fits in your palm."

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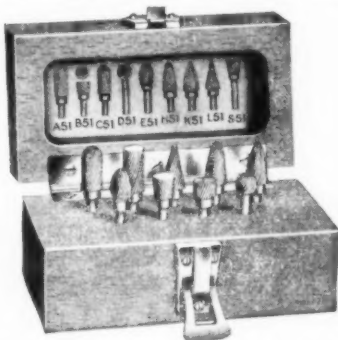
SANFORD MFG. CO.

1020-28 Commerce Ave.

Union, N. J.

ATRAX 1/4" HIGH SPEED CARBIDE BURS

Most carbide burs have been confined to the 1/8" size, since they can be operated efficiently at high speeds in portable tools generally equipped with collets up to 1/8". To comply with the demand for a larger bur for use in these high speed tools, the Atrax Co., manufacturers of cemented carbide burs, have brought out a line of 1/4" carbide burs on 1/8" heat treated steel shanks. These burs allow greater speed and strength and maintain longer life.



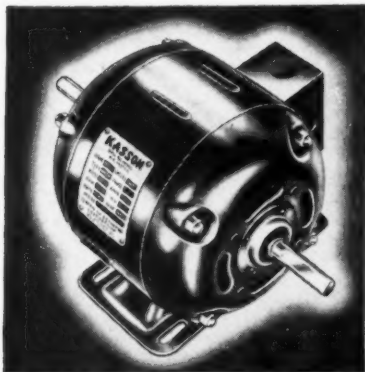
The burs are machine-ground to exact pre-determined design. The helix, rake, depth of flute, fillet and finish, are all precisely controlled. The Atrax grinding process permits the use of a coolant which produces a smoother finish for better chip clearance, and eliminates heat checks, surface cracks, and the crumbling of cutting edges.

The Atrax line of 1/4" burs is available in nine different shapes, packaged in a birch or maple box to protect the cutting edges. Circular A53, describing this line of tools is available by writing to the Atrax Co., 240 Day St., Dept. BB, Newington 11, Conn.

INDUCTION MOTOR FEATURES ALL-STEEL HOUSING

The 50,000th Kasson Rotomotor, first all-steel fabricated fraction HP. ball bearing electric motor ever built, incorporates several improvements. "An all-steel housing in an induction motor of this type is the first revolutionary improvement in the electric motor in forty years," Mr. Kasson declared. "The replacement of time-honored, bulky, and laboriously machined castings with relatively light pressed-steel housings was

a difficult problem. Nevertheless we solved it, achieving perfect alignment in the bearing seat as well as complete rigidity, which were the two big factors involved."



The life of the motor has been increased considerably as the starting winding is now made from glass insulated

wire, while the gun-metal oxidation of the starting mechanism before assembly minimizes rust in service. Sealed-for-life ball bearings are standard equipment on all Kasson motors. For further information, write to the General Die and Stamping Co., 262-272 Mott St., New York 12, New York.

PASTE FLUX FOR GAS WELDING SUPERSEDES POWDERED FORM

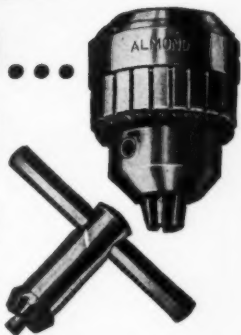
All-State Welding Alloys Co., Inc., announces a paste cast iron flux for gas welding. This paste flux is painted on the clean surface of the cast iron while the casting is still cold. A single application of the flux is sufficient. The cast iron welding rod may also be painted with the flux in order to provide additional flux as the work progresses. Best results are obtained when the surface to be welded is ground, chipped or filed to a bright finish before painting with the flux.

This flux is used in the repair of broken castings, salvage of defective castings, repair of pitted cast iron molds, and correction of machine shop errors. It is known as All-State No. 1A cast iron flux. Additional information will be supplied by the All-State Welding Alloys Co., Inc., 93, W. Post Road, White Plains, N. Y.

ALMOND... *Triple Jaw* DRILL CHUCK

The Almond Three-Jaw Drill Chucks were pioneers in the field of drill chucks. Since 1872 they have played a necessary part in the logical procedure of machine developments.

Almond Chucks are furnished in nine sizes with capacities from 3/16 to 1". They are made for heavy and light duty types with taper or threaded arbor hole—to fit all machine tools and portable tools.



Write for complete details.

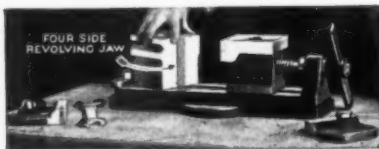
The Original
Manufacturers
of Drill Chucks

T. R. ALMOND CO.
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SAVING TIME ON 1000 JOBS

You will eliminate from your payroll many hours of highly-paid Machinists' time if you have these men use the JACKSON TIME-SAVING VISE. It cuts out the time they are forced to waste hunting for Bolts, Clamps, Angle Plates, Parallel Strips, etc. when "rigging up" work on the Drill Press, Miller, etc. Furthermore, you can eliminate the simultaneous loss of output and overhead expense incidental to having your productive machine idle during the "rigging up" process. The four-side turret jaw and supplementary jaws enable the Vise to hold quickly, THE THOUSAND AND ONE SHAPES that arise annually in Machine Shop work. SEND FOR BULLETIN No. 23-B.



BROWN ENGINEERING CO.

126 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

NEW TABER DEVICE EVALUATES SURFACE FINISH RESISTANCE

A device that facilitates greater accuracy and promotes more consistent reproduction of results in evaluating the resistance of surface finishes, plastics, etc., to normal abrasive wear, is announced by the Taber Instrument Corp.

Designated as Model 100-108 Vacuum Pickup Attachment, it is designed for application with the Taber Abraser, a precision instrument utilized in laboratory research testing practice to determine the wearability of various materials in connection with product development and research, or as a production control aid.

Superseding the company's older E-4009 model, the improved attachment is a 2-stage turbine vacuum device that removes abrading from the wear track produced on the surface of the test sample by the instrument's revolving abrading wheels, assuring uniform contact of wheel faces against the specimen. Its chief features are: (1) variable controllable suction; (2) centralized electrical connections for all Taber wear-testing apparatus, including an interval timer and an illuminated magnifier; (3) a rotative suction nozzle.



The vacuum turbine is connected to the Abraser with rubber-covered flexible tubing. The suction nozzle assembly is mounted on the right-hand arm support of the tester; the rotative nozzle is adjusted to the proper height for specimen thickness.

Equipped with the Powerstat Regulator, the standard Vacuum Pickup Attachment

operates on 115-volt, 50/60-cycle current supply, and is adaptable to 230-volt, 50/60-cycle operation. Further data is available from the Taber Instrument Corp., 111-MTBB Goundry St., North Tonawanda, N. Y.

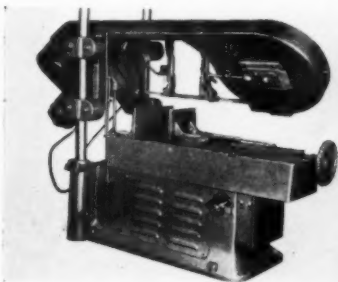
METAL SAW HAS AUTOMATIC CUTTING CYCLE

The Wells No. 12, a heavy-duty horizontal metal-cutting band saw, features an automatic cutting cycle in which the blade is fed into the work at a constant pressure and the cutting head is returned by hydraulic power to its starting position above the work upon completion of the cut. Elimination of manual operations is designed to reduce operator fatigue and make possible higher production, while control of blade pressure is claimed to result in a better cut, more efficient operation, and reduced blade breakage.

The saw, developed by Wells Manufacturing Corp., is designed to cut off rectangular stock up to 12" deep by 16" wide or cylindrical stock up to 12 $\frac{3}{4}$ " diameter. In addition to cutting through stock, the saw can be controlled to cut to any desired depth for work on dies or other parts.

The saw is of heavy, rigid construction.

The base and bed are castings. The cutting head rides on closely fitted rollers on two heavy columns, with the hydraulic system enclosed in the base. The saw blade is enclosed except at the cutting zone. Cutting speeds are 50, 90, or 150 ft.



per minute. A $\frac{3}{4}$ hp. motor drives the blade and a $\frac{1}{3}$ hp. motor drives the hydraulic pump. Overall dimensions are: 59" high x 78" long x 32" wide. Additional information furnished by the Wells Manufacturing Corp., Dept. BB, Three Rivers, Mich.

DRILL JIG BUSHINGS



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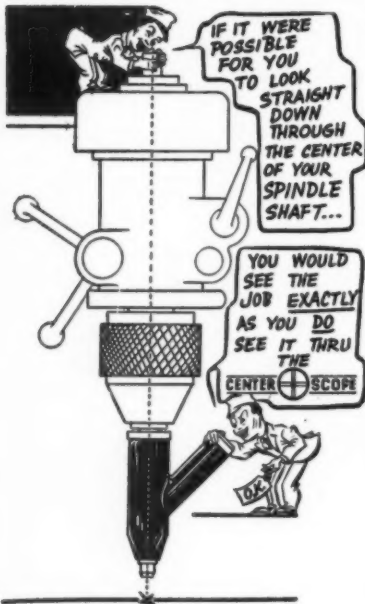
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Line-up your layout in 30 seconds.

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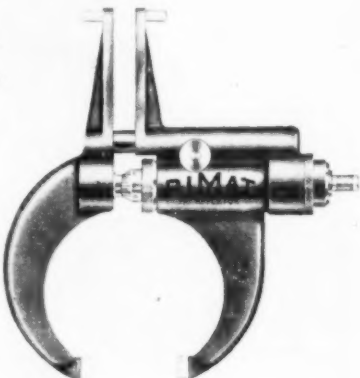
Write for Catalogue No. 8

CENTER SCOPE PRODUCTS
3829 San Fernando Road
Glendale 4, California

NEW MICROMETER MAKES INTERNAL AND EXTERNAL MEASUREMENTS

The Richards Machine Tool Co. announces their new "Rimat" Duplex Micrometer, for internal and external measurements. Positive reading eliminates errors, increasing speed and accuracy on the job; the graduations are exceptionally easy to read.

The Rimat Duplex Micrometer is regularly made in three sizes: 0-1", 1"-2", and 2"-3". Special sizes are available upon order. A companion tool to the Rimat Inside Micrometer, announced in the May issue of the Machine & Tool Blue Book, the Rimat Duplex is made of the finest materials available, and is of superior



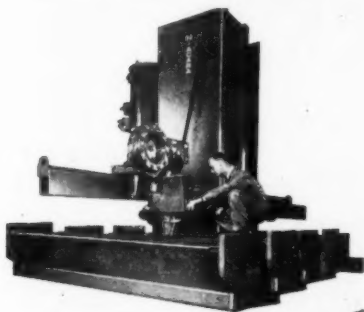
workmanship. The ends of the measuring pins are hardened and ground on a radius for accuracy, and to prevent cramping. All wearing surfaces are also hardened and ground and are adjustable, if necessary. Further information is available from the Richards Machine Tool Co., 124 So. Isabel St., Glendale 5, Calif.

ELECTRONIC AUTOMATIC WELDING MACHINE

The Niagara Machine and Tool Works announces a new Electronic Automatic Welding Machine providing fast welding, less passes per seam, and stronger and better quality welds.

The electronic control provides variable speed of the machine along a track so that the length of welding is governed

only by the track length. Welds perpendicular to the track are accomplished by traveling the welding head at a variable speed along the cantilever beam. Finger



tip, push-button control quickly brings the power elevated beam to any height position, providing maximum speed in changing setups. All welding adjustments and machine movements are controlled from one centralized push-button station.

The progressive advantages of Automatic Welding are illustrated in new Bulletin 83, available by writing the Niagara Machine and Tool Works, 683 Northland Ave., Buffalo, N. Y.

RUBBER PROCESSED MATERIAL HANDLING SEPARATORS

Woven wire screen and expanded or perforated metal in all mesh and sizes, completely covered with rubber, for material handling purposes, is announced by Automotive Rubber Co.

The primary purpose of the separators is to protect by rubber cushion, parts which have been plated, painted, or precision finished, from becoming scratched, marred, or disfigured by contact with metal surfaces. The mesh separators also permit drainage.

Any size separators can be furnished to fit bottoms of tote pans, conveyor baskets, or pallets, and can be covered with hard, semi-hard, or soft natural rubber or synthetic rubber, to meet specific conditions. Additional information on these products is available from the Automotive Rubber Co., Inc., 8672 Epworth Blvd., Detroit 4, Mich.

"NOW WE CAN HAVE VARIABLE SPEEDS!"

For
speed-up or slow
speed drives

Five pulley sizes. Up to
8 h.p. Long motor support
rods available for large
driven sheave or pulley.

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IDEAL
CHICAGO**

**COUNTERSHAFT
UNIT**

with IDEAL Wide V-
Belts and Sheaves—
a complete drive.

3:1 ratio efficiently adapts this
combination to thousands of uses
where high cost installation made
variable speed impossible. Multiple
reduction—fits in space limita-
tions. Finger-tip control. Most
flexible. Input or output from
either side. Compact. Pressure
lubricated.

SEND FOR COMPLETE
LOVEJOY-IDEAL CATALOG

Also shows Variable Speed Pulleys, "Select-O-Speed" Transmissions, Wide V-Belts, Adjustable Motor Bases, etc. Wire or write.

Mfd. By
LOVEJOY FLEXIBLE COUPLING CO.
*Mfrs. Lovejoy Flexible Shaft
Couplings*
5026 W. Lake St., Chicago 44, Ill.

GOGGLE KEEPS OUT POWDER BY DOUBLE SCREEN

A new dust goggle, recommended for operations where fine dust particles and powder create eye hazards, on compressed air and other industrial operations, is announced by American Optical Co., Southbridge, Mass. Besides protecting against dusts, this goggle provides wide-angle vision, ventilation, with comfort and safety. The flexible leather mask combines comfort with tight fit; the eyecups are set deep to prevent obstruction with side vision.

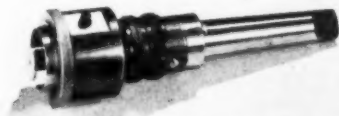


Wire screen ventilators around the eyecups provide ample ventilation to help keep lenses from fogging. Sparks and flying objects cannot reach the eyes. A fine wire screen (150 mesh) set behind a 16 mesh wire screen keeps out dust particles

and powder. The goggle is available with Super Armor-plate or 6 Curve Super Armorplate clear or Calobar lenses in medium, dark or extra dark shades.

NEW PRECISION RECESSING TOOL

A line of precision recessing tools for grooving, back-facing and similar operations is announced by The Maxwell Co. Tools are available in four sizes for work-piece hole sizes from $\frac{3}{8}$ " to 1", 1" to 2", 2" to 3" and 3" to 4". They are rugged, fully automatic and adaptable for use in drill presses, boring mills, turret lathes, automatics and milling machines.



The tools are equipped with tapered or straight shanks threaded into the tool sleeve and shanks are interchangeable. Standard cutters are made of high speed tool steel. Both cutter and pilot can be of any required size or shape. Multi-blade

A Modern

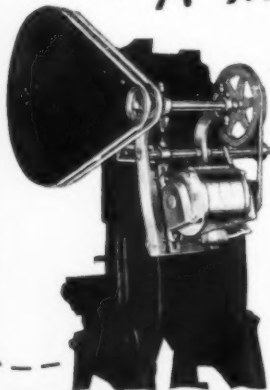
MOTOR DRIVE FOR EVERY MACHINE TOOL

The Modern Motor Drive shown here, fills an urgent demand for an easily mounted economical Punch Press Drive.

Utilizing the jackshaft principle, permitting the use of standard 1750 R.P.M. Motors.

Brackets for direct drive from motor to flywheel are also available from stock.

Write for catalog showing complete line of Modern Drives for other machine tool equipment.



THE NICHOLS ENGINEERING COMPANY...
2400 W. MADISON ST. CHICAGO 12, ILL.

cutters for cutting two or more grooves simultaneously can be supplied.

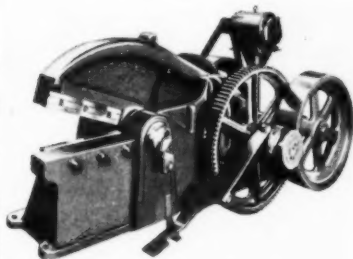
When recessing tool is attached for operation, the pilot enters the workpiece and the cutter is fed to the predetermined amount. Depth of cut or recess is controlled by adjustable stop limits and tolerances can be held to within .001". Cuts can be taken at extremely high feed rate and the operation requires only fingertip pressure. Accurate adjustment of recess spacing can be made from either top or bottom surfaces. The pilot assembly is ball bearing mounted so that free rotation of either tool or workpiece, is assured.

Additional information is contained in bulletin No. R-246, available from the Maxwell Co., 386 Broadway, Dept. BB, Bedford, Ohio.

NEW AUTOMATIC SHEARS STRESS ACCURACY

The Doelger & Kirsten Corp., is producing a new line of automatic alligator shears for use where accurate dimensional cutting is required, as in forge shops, steel warehouses, and industrial plants.

A new type of foot operated clutch and brake mechanism permits the operator to feed the shear and adjust the cut exactly as desired. The entire mechanism is simple, positive and safe, assuring accurate shearing under all conditions. If continuous operation is desired the foot treadle can be latched down.



"Milwaukee" Automatic Shears are available in seven sizes and in a variety of styles to meet any requirement. Complete details and specifications are provided in a new 28-page catalog No. 678, available upon request to the Doelger & Kirsten Corp., 3015 W. Chambers St., Dept. BB, Milwaukee, Wis.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

You get faster dressing of grinder wheels plus lowered maintenance costs with YELLOW HEAD "Self-Lubricating" Dressers. Thin film of dry graphite is sucked from large magazine to provide constant lubrication to moving parts. As shown above:

A—Magazine for dry graphite, B—Ducts to bearings, C—Spindle bearings, D—Safety hood. There's also a plain type and selection of cutting heads available.

CITY MACHINE CO., DEPT. MT
PIQUA, OHIO



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for complete details and prices

Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work — longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA
50,000 R.P.M.

\$33²⁵

IN U.S.A.



Weight 12 ounces;
length 6 $\frac{3}{4}$ inches;
chuck size $\frac{1}{8}$ inch.
Wheel guard re-
moved for better
illustration.

MADISON-KIPP CORP.

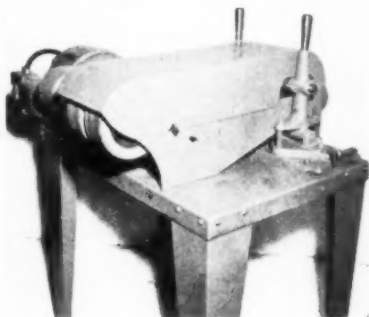
207 Waubesa St., Madison, Wis., U.S.A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS

DOUBLE BELT BENCH GRINDER

The Porter-Cable Machine Co., Syracuse, N. Y., announces an addition to their line of precision abrasive belt grinders, the new model DBS Double Belt Bench Grinder.

A heavy duty drive shaft mounts two sturdy 7" diameter by 2 $\frac{1}{2}$ " wide resilient contact rolls located side by side and only inches apart. Each contact roll is aligned with an idler adjustable for abrasive belt tension, tracking and lining up with the contact roll. This set up provides for the use of two endless metal cutting abrasive belts 2 $\frac{1}{2}$ " wide by 60" circumference. The result is a two station grinder . . . one station can be fitted with a coarse abrasive belt for rough grinding, the other with a fine grit belt for finishing. Since both stations are very close together, the operator is not required to hop back and forth from one side of the unit to the other to perform the different operations. In addition the resilient roll receives little, if any wear. All work is done by the millions of sharp cutting abrasive grains almost entirely exposed, with no binder or filler to interfere with its full cutting capacity.



Abrasive belt change when required is accomplished in a few seconds and since the circumference of the belt is greater, heat is dissipated. . . the cooler job cuts faster and cracking, checking, etc., is eliminated.

The DBS equipped with 1 HP motor gives the abrasive belt a cutting speed of 5200 surface feet per minute. A dust guard designed so that dust follows naturally to an outlet in the rear of the

unit is furnished as standard equipment. Accessory items available include an 8" diameter contact roll, 29" high or 12" low leg assemblies, and a wire brush attachment.

Ideal for working all types of metals, the DBS performs equally well on such operations as burring gears, generating radii, weld grinding, removing flash, flat and edge work, and all types of clean up and polishing operations. The whole unit is ruggedly constructed and runs free of vibration.

FALLS ENGRAVING TOOL

An Engraving Tool which is a departure from most marking devices, has been developed by Falls Products, Inc. The standard carbolov tip will mark surfaces up to Rockwell C-50 in hardness. For marking surfaces harder than this, a diamond tip bit is available. Other accessory bits are also provided to perform such operations as cutting shim stock and thin metallic foils, cutting and etching on glass, for filing, chiseling, and riveting operations.

The Engraving Tool is useful for iden-

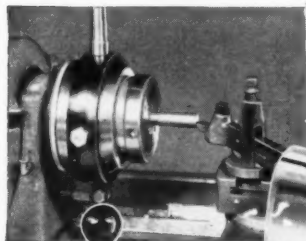
tification marking on tools, patterns, fixtures, and subassembly parts. It is also used by tool-makers, and pattern makers, for filing, chiseling, and shaping odd contours.

The Falls Engraving Tool is shaped to fit snugly in the hand. The center of gravity has been located so that the tool can be used for hours without fatigue.



The cord leads out beneath the operator's hand, with the switch placed beneath the finger of the operator.

The Engraving Tool is a product of Falls Products, Inc., 122 Genoa St., Genoa, Illinois.



Selective Adjustment Ring



Radically New Patented Design

- Hand-operated self-locking selective adjustment ring maintains set predetermined pressures—assures solid grip on work.
- Levermatic Chuck operates without stopping spindle and without heating—runs entirely cool.
- Minimum overhang and minimum runout. Precision operation on metals and plastics.

Write for Catalog

PORST BROS. MFG. CO.

Manufacturers of Collets and Fingers for 25 Years

New — Levermatic COLLET CHUCK

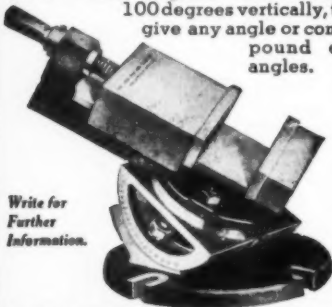
with many PLUS Features
Meets Today's Precision
Production Needs

- 1-inch capacity specially engineered Porst Collet maintains positive, straight parallel grip on work at all times.

261 N. California Ave.
Chicago 12, Illinois

New Britain UNIVERSAL VISE THE ORIGINAL

Swivels 360 degrees horizontally,
100 degrees vertically, to
give any angle or com-
pound of
angles.



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Further
Information.

NEW BRITAIN TOOL & MFG. CO.
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SEND US YOUR PRINTS FOR *Quotations*

THREAD GRINDING

*Also Internal, External
and surface grinding.*

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SCREW MACHINE PRODUCTS

MAGNETIC INSPECTION

● GEARS ●

SPUR BEVEL

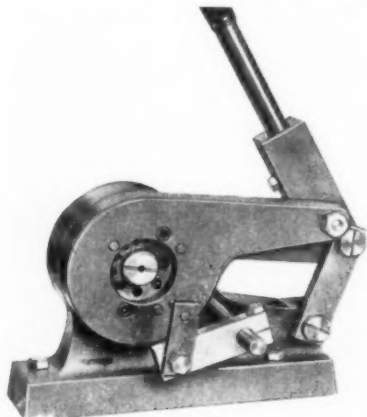
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MANUFACTURERS OF
AVIATION & AUTOMOTIVE PARTS
Gear Specialists
1917 EAST 81ST ST. • CLEVELAND 3, OHIO

ROD CUTTER OPERATES TO CLOSE TOLERANCES

This precision unit comes in two sizes, with capacities of $\frac{3}{8}$ " and $\frac{1}{2}$ ", cold rolled steel bars. Known as the Di-Acro Rod Parter, it is a rugged precision machine designed and manufactured for accurately cutting round materials without distortion on a production basis. The "parting-off" method employed by this accessory offers the highest production rate for cutting rods and bars. It incorporates a powerful leverage arrangement which provides great ease of operation. Three



Torrington Roller Bearings greatly reduce friction, thereby increasing material capacity.

Extremely small diameter rods in various materials can rapidly be cut off to very close tolerances as to length, squareness and concentricity; this same accuracy can be maintained in larger diameter materials because of the exacting control of production tolerances. Detailed information available from the O'Neil-Irwin Manufacturing Co., 314 8th Ave., Lake City, Minn.

NEW USES DISCOVERED FOR GALVALLOY

It is now possible to tin Magnesium with Galvalloy and use pure zinc as a filler or soldering agent. Molten zinc can be poured against the Galvalloyed surface of the Magnesium, and a permanent bond is obtained. Ordinary solder may be

used instead of zinc, if desired. Zinc or pot metal are suggested in cases where more strength is required than ordinary solder bond. Another new use for Galvalloy which has been discovered recently, is the repair of corroded areas in Degreasing Tanks. Galvalloy withstands the corrosive action of the vapors very satisfactorily. This will save many industrial plants time and money as the repairs can be made rapidly with the use of a welding torch and a wire brush. It also saves costly delays in production which are encountered if the tank has to be re-dipped or galvanized.

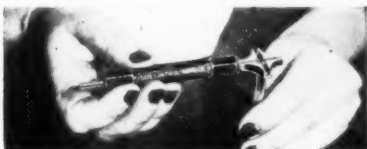
Galvalloy is a product of the Metal Products Co., 1351 E. 17th St., Los Angeles, California.

NORBIDE LONG-WEARING PLUG GAGES

Norbide provides an ideal material for plug gages, since it eliminates to a great extent the wear tolerances which develop in gages, causing rejects and retarding inspection processes. The use of norbide plus the reversible plug feature gives the latest Size Control Norbide Reversible Plain Plug Gage many times the service life of old style taper lock steel gages, according to the manufacturer. Such wear resistance eliminates the frequent

passing of substandard parts in inspection, due to a gage being worn undersize, as well as the expense of plug replacement.

Norbide service life is furthered by the reversible plug feature of these gages. The plugs reverse quickly in a positive-locking, pin-vise handle; this double life is further increased by cutting worn tips of these extra-long plugs and exposing new gaging surface. The aluminum handle provides strength with reduced weight. The "Go" end is finished in green, the "No-Go" end in red for rapid identification.



Complete data on these and other precision products of the Size Control Division of the American Gage Machine Co. are given in Catalog 47. Address request to the Size Control Co., 2500 Washington Blvd., Chicago 12, Ill.

Specify



COMPACT DESIGN

HIGH TORQUE

HIGH-RATIO LEVERS

POSITIVE NEUTRAL

PRECISION BUILT

LONG WEAR LIFE

EASY ADJUSTMENT

ROCKFORD



PULLMORE MULTIPLE-DISC CLUTCHES

HIGH Torque

PULLMORE discs provide high capacity, and efficient lever design enables light engaging pressure. Discs are accurately made from special clutch-disc materials and are tested for flatness. Made in single and double types, for operation in oil or dry. PULLMORE clutches have capacities from 1 to 90 H.P. at 500 R.P.M. They handle loads of much greater capacity when operated at higher speeds.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



ROCKFORD CLUTCH DIVISION

BORG-WARNER

1309 Eighteenth Avenue, Rockford, Illinois, U. S. A.

CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

Let us have your inquiries.

BLOOMFIELD TOOL CORP.

36 Farrand St.

Bloomfield, N. J.

BORING TOOL ROUGHS, SEMI-FINISHES, AND FINISHES

Designed for repetitive boring operations, and without changing cutter bits, it is possible to rough, semi-finish and finish bore with the new Kwik-Size Boring Tool. The boring head, which is mounted on an eccentric arbor is merely indexed for individual cuts. Uniformity of bore size is assured, for the boring head is locked in accurate position after each indexing.

The Kwik-Size Tool is used for stub bar boring only, using either carbide cutting tools or high speed steel bits.

These tools consist of an alloy-steel heat-treated integral eccentric arbor and shank, a detachable boring head, drive key, and knurled lock nut. The end of the arbor is threaded to receive the lock nut which is tightened with a wrench to secure the boring head to the arbor body. The drive key projects from the body of the arbor. This key snugly fits into each of the three slots in the boring head, and serves as the indexing stops for the cutters.

Using ordinary $\frac{3}{8}$ " square tool bits and different diameter heads, any size holes from 4" to 8 $\frac{1}{2}$ " in diameter can be bored.

D. C. MOTORS

Good delivery on $\frac{1}{4}$, 1/3 & $\frac{1}{2}$ H.P. direct current motors. Mfrs. of A.C. generators 500 watts to 125 K.W. Rotary converters, frequency changers, light plants.

KATOLIGHT

1415 First Avenue

Mankato, Minn.

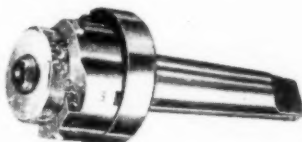
KNURL it Easily, Quickly, Safely

Use any Standard Knurls $\frac{1}{8}$ " x $\frac{1}{4}$ "



Joseph B. Fakes & Co., Royal Oak, Mich.

Tool bits can be adjusted in each size head to give a range of approximately



$\frac{3}{8}$ " variation of diameter. To make additional cuts, an extra head is fitted to the eccentric arbor.

The Kaukauna Machine Corp., Dept. BB, Kaukauna, Wis.

CRESCENT 4-WAY SOLENOID AIR VALVE

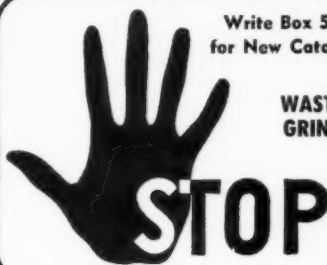
A compact, fast-acting 4-way air valve is announced by the Crescent Valve Co. The design comprises stainless steel balls travelling between opposed, closely aligned brass seats. The unit is lever actuated, spring biased, and solenoid operated. The Crescent valve may be utilized at any practical speed, and is engineered to deliver approximately the full

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

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NIELSEN TOOL & DIE COMPANY
1962 W. Eleven Mile Road,
Berkeley, Mich.



Write Box 58B
for New Catalog!

MARSHALL STEEL

LISLE, ILLINOIS

WASTING TIME ON CUTTING, SHAPING AND GRINDING DIE BLANKS—When you can BUY

Ready-to-use . . .

GROUND FLAT STOCK

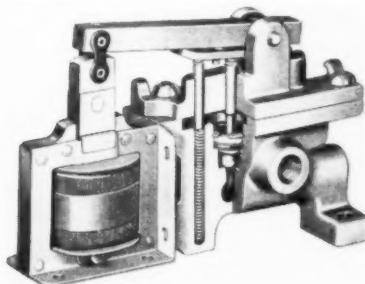
Also Production Surface

Grinding on Hugh Mattison Grinders.

**SPECIAL SIZES HEAT-TREATED or SOFT,
GROUND TO YOUR SPECIFICATIONS.**

volume of the pressure line with minimum pressure loss.

The valve is made in the $\frac{1}{4}$ " size only, but may be substituted for some conventional $\frac{3}{8}$ " valves, due to abnormal



volume output. Dimensions are approximately 2" x 6" x 4". Due to its size, weight, and freedom from servicing, it may be installed close to the cylinder in accessible places for maximum efficiency.

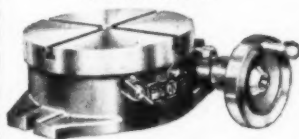
The unit is recommended for pressures up to 140 psi. It may be converted to a 3-way valve by plugging one outlet port. The valve is normally supplied with solenoids to operate on 115 volts, 50/60 cycles, with inrush current of 1.85 amperes and a holding current of .29 amperes.

Further information on this product is available from the Crescent Valve Co., 6073 State St., Huntington Park, Calif.

IMPROVED DISKONECT REFLECTOR

An improvement of the Diskonect Reflector is announced by the Goodrich Electric Co. Designed for instant attachment or removal to simplify cleaning, the new Diskonect is equipped with a spring lock that requires only thumb pressure of one hand to release it. The reflector, socket and lamp are removed as a unit. Quick disassembly of all parts is simplified by a spring-mounted socket, removable by slight upward pressure and a quarter turn. This "come-apart" construction permits cleaning of all parts separately. The Goodrich Electric Co., 4600 Belle Plaine Ave., Chicago 41, Ill.

TROYKE ROTARY TABLES



7 SIZES—10 MODELS
9" TO 25"

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Ask Your Dealer
Or Write

CARROLL DIVIDING HEADS



3 SIZES—4 MODELS
6" TO 12"

TROYKE MFG. CO., 4422 Appleton St., Cincinnati 9, Ohio

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TRICO OILERS

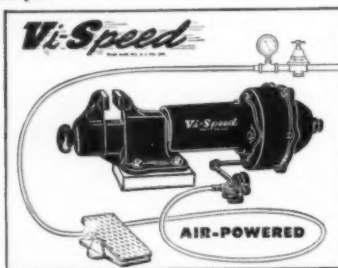
Automatic, accurate, dependable lubrication . . . no guess-work, bearing failures, idle machines or waste. There's a type for every application.

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TRICO FUSE MFG. CO.
Milwaukee Wisconsin

VI-SPEED AIR-POWERED BENCH VISE

An air-operated unit combined with a vise into a single tool is in production by the Van Products Co. Designated as Vi-Speed, the unit consists of a standard bench vise with a 7" maximum jaw opening, 4½" wide, actuated by compressed air by means of a foot pedal. The maximum air stroke is 1¼". Recommended working air pressures range from 15 to 150 psi.



The foot pedal operation of the Vi-Speed frees both hands of the operator. A slight toe pressure on the pedal closes

the vise jaws, and heel pressure opens them. If desired, the foot pedal locks in either position. The safety top screw is adjustable to limit the jaw travel to the minimum required stroke, thus the jaws cannot close beyond the set point. The operator may be seated, since the foot pedal is movable. Due to an air regulator valve, the jaw pressures may be set to any pressure of from 0 to 3½ tons, making the Vi-Speed useful for holding light, delicate work as well as heavy or unwieldy castings.

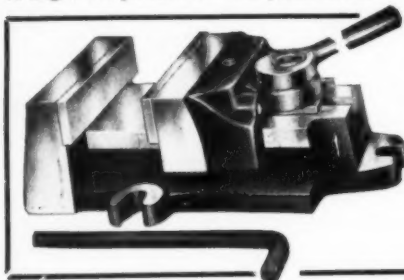
The Vi-Speed may be installed in any position to handle various sizes or kinds of material. Installed vertically, it is often more convenient for some types of operation than in the conventional horizontal position. Further information, in illustrated Bulletin No. 47-1-3M, is available from the Van Products Co., 1519 Baldwin Bldg., Erie, Penna.

ROLLER LEVELER FOR THIN-GAGE SHEETS

A roller leveler for thin-gage sheet metals which cannot be flattened satisfactorily by conventional types of levelers has been built by the Voss Machinery Co. The unit is a properly backed-up Roller Leveler with ¾" diameter work rolls which flattens alloy and perforated sheets from .010" to .030" thick, and up to 28" in width.

To accomplish the correct flattening of the sheets, all controls are worked from levers mounted on the top of the machine, and from a hand-wheel located below them, all placed at one end of the leveler near the electrical controls for the variable speed drive, allowing the operator complete control over the entire machine.

It is designated as the "Inverted Type



PLUNKET QUICK ACTION VISE for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws.

Eccentric motion moves jaw 5/16".

Size 6" jaws, 1½" deep, opens 4" Net Price \$46.20

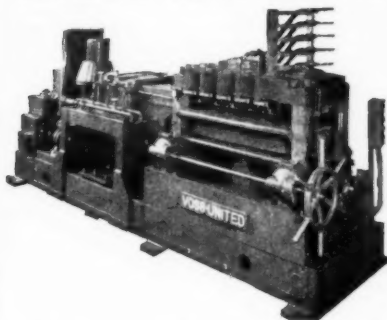
Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

WRITE FOR CATALOG

J. E. Plunket Machine Co. 1823 W. Lake St.
Chicago 12, Ill.

Leveler," since due to the simplified construction, the lower flight of rolls is tiltable instead of the upper, as is the usual construction of this type machine. The



machine is a product of the Voss Machinery Co., 2882 W. Liberty Ave., Pittsburgh 16, Penna.

PREIS ROTARY WORK TABLE

A 5-inch-diameter rotary work table for engraving, profiling, graduating, milling, and drilling on circular name plates, dials, round dies, or any object requiring circular or semi-circular cutting, is offered by H. P. Preis Engraving Machine Company, 157 Summit Street, Newark 4, N. J. Although designed primarily for use on the Preis pantographic engravers, its compactness and low build make it adaptable to virtually any engraving machines. It can be used to advantage also on small-production milling and drilling machines.

The outer rim of the turn-table is marked in degrees and numbered at every tenth degree. Every degree is notched, for quick and accurate division

STANDARD PARTS

FOR
JIGS, FIXTURES,
DIES, GAGES, TOOLS
AND MACHINERY

Featuring
Hand Knobs, Quarter
Turn Screws,
Spherical Washers,
"C" Washers, Jig
Feet - Locating Keys

Write for Catalog No. 2
Inquiries for Tool Dies
and Mold Estimates
Invited.

GEORGE F. BUB AND SON
11418 MADISON AVE. CLEVELAND 2, OHIO

by engaging the index unit. This unit can be disengaged for free turning, using a cam-lock to secure the turn-table.

Top and bottom surfaces are ground accurately parallel, to assure an even depth of engraving or other class of machining over the entire surface. The working surface is provided with four tee-slots for 1/4-inch bolts, and a 5/8-inch-



diameter hole for centering the work with a stud. The over-all height is only 1 3/4 inches. Net weight is 9 pounds.

New **NESTING TYPE
TOTE PANS**

20" Long x 12"
Wide x 6 1/4" Deep
16 Ga., drag holes,
handles both ends.

J. L. LUCAS & SON, INC.
BRIDGEPORT 5, CONN.

High Speed Cutting Tools

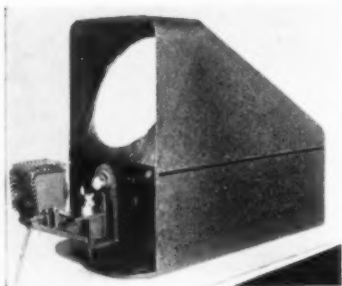
- Special high speed circular, dovetail, flat form and special tool bits.
- Design and manufacture of small machines, jigs, gages and experimental parts.
- Regrinding and salvaging high speed flat form, special bits and small flat broaches.

DELIVERY AS REQUIRED
WRITE FOR QUOTES

Attractive Proposition for Representatives

Lincoln Park Manufacturing Co.
3302 Dix Road Lincoln Park, Mich.

GOOD NEWS from PORTMAN



Now you can use Optical Projectors anywhere in your shop—to speed up production.

The Portman Model P2.5 Optical Projector is so ruggedly built and so easy to operate that many firms are using them right out in the shop—in places where they can do the most good! When you save on your inspection time you make money. The PORTMAN MODEL P2.5 should help you make this extra money.

The full price is only \$175.00 and deliveries are excellent.

Write or wire for details.

PORTMAN MACHINE TOOL CO.
70 Portman Road, New Rochelle N. Y.

CABINET TYPE FLEXIBLE SHAFT MACHINE WITH VARIABLE SPEEDS

A new variable speed flexible shaft machine is announced by Wyzenbeek & Staff, Inc.. Known as the "Wycomatic" Speed Changer this model is described as an outstanding advance in flexible shaft machine design and engineering, since it frees the operator from the restrictions of fixed speed machines and allows complete speed control of a precision shaft which can be instantly adjusted to any desired speed or for operations requiring a range of speeds. By means of an adjustable dial control the "Wycomatic" permits a gradual change of speeds, eliminating dependence on the usual arbitrary setup from one fixed speed to the next. The operator can select any low speed, such as those used for wire brushing, intermediate speeds for sanding, burring or grinding, or any high speed suitable for bond grinding or for small diameter wheels.



Features claimed for the new "Wycomatic" Speed Changer include the safety cabinet which swivels on ball-bearing motor base and encloses the speed change mechanism and belt guard, the low center of gravity eccentric lock which can be used to hold handpiece so securely that machine can be used as stationary grinder, and an eccentric adjustment on jack-shaft for belt tightening. The "Wycomatic"

matic" is equipped with Wyco precision shaft, precision handpiece, wheel arbor, 6" grinding wheel, and wheel-guard. Four models are available, all with 50 or 60 cycle, single phase or 3 phase motors. Detailed information may be obtained from Wyzenbeek & Staff, Inc., 838 W. Hubbard St., Chicago 22, Ill.

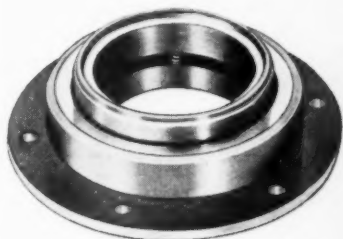
CARBON SEAL SOLVES HIGH SPEED REQUIREMENTS

Announcement is made of a new high speed carbon ring oil-seal which particularly suits sealing applications where oil lubrication is at a minimum, where the seal runs in a liquid other than grease or oil, or where the shaft speed is greater than that satisfactorily served by a bronze ring, even though a good supply of oil is available.

These carbon rings, developed especially for shaft seal use, have a low coefficient of friction and self-lubricating qualities. The material is heat resistant, is not subject to warping, is chemically inert, and corrosion resisting.

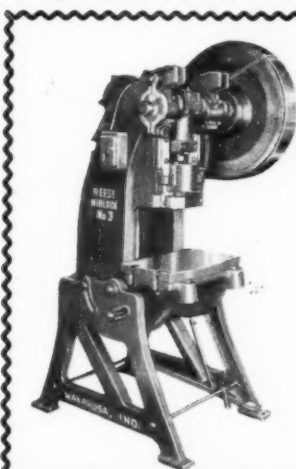
The entire assembly, known as the Gits DMC and DPC High Speed Carbon Faced Seals, features a sealing principle that eliminates shaft wear and the need for replacement of grooved shafts. These

seals effect a perfect seal against leakage of liquids or gases under pressure or vacuum by means of a radial seal joint made by positive contact between a stationary lapped seal surface built into the



seal unit and a rotating lapped seal surface. The unit does not touch or wear the shaft surface, but transfers the wear to the radial seal joint instead.

The Gits Bros. Manufacturing Co., 1846 So. Kilbourn Ave., Dept. BB., Chicago, Ill.



Inclinable **POWER PUNCH PRESS**

Design:

Well designed with metal added at points of greatest stress.

Tripping Device:

Non-Repeat sliding key type, few wearing parts, simple adjustment, dependable performance quickly converted to continuous operations.

Spring Counter-balanced Reclining Device:

Press can be inclined to 38° angle or returned to vertical position by simply loosening leg bolts and pushing press over or up to position required.

Quick Relinable Brake:

Merely remove hand wheel, spread brake apart, remove worn linings and insert new. No Riveting.

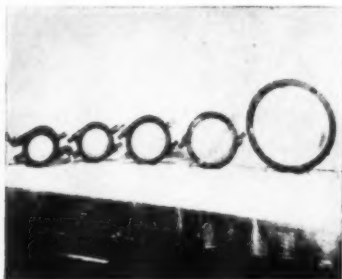
Die Space:

Extra large die space and bolster area.

REESE-NIBLOCK, INC. WAKARUSA, INDIANA

LEPEL QUENCHING RINGS SPEED HEATING CYCLE

Lepel High Frequency Laboratories, Inc., announce the manufacture of larger quenching rings for use in semi-automatic hardening of gears and similar parts.



These rings are designed for use in a standard Lepel Roto-heating and quenching unit and tank. With their use, gears or other circular shaped parts can be hardened in a few seconds, semi-auto-

matically. Gears are dropped into the lead coil, a button pressed, and the heating and quenching takes place automatically. The part is rotated slowly during the timed heating cycle to insure uniform penetration to any desired depth; after the high-frequency current is cut off, a water spray, from several hundred openings in the quench ring, immediately quenches the part while it still rotates. The quench is then automatically cut off, and the hardened part is ready for lifting out.

Complete information is obtainable from the Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, New York.

CHAMPION RUBBER-TIRED INDUSTRIAL WHEELS

A complete new line of rubber-tired wheels for industrial uses is announced by the Champion Iron Works. In a range of sizes from 4" to 14" extreme diameter, and from 1 3/4" to 3" diameter of tire section, these puncture proof wheels are available with choice of sealed ball bearings, plain bronze or oil-impregnated sintered bronze bearings. The maximum standard bore is 5/8". The tires are identified by well-known brand names and are

PRODUCTION STANDS OUT WHEN PROTECTION IS BUILT IN!

With Junkin Safety Guards on the job, EVERY MINUTE is devoted to production—because costly, time-consuming accidents are eliminated.

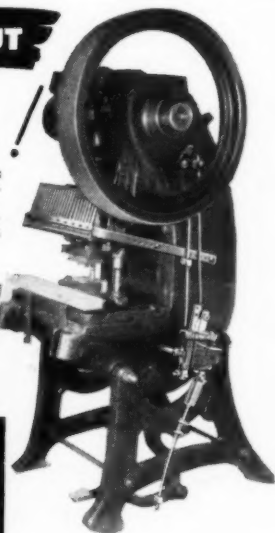
You reap the important benefit of improved worker efficiency too, for with this ever present evidence of protection press operators are able to hit new peaks of efficiency.

Send for bulletins describing the Junkin Safety Guard and Swinging Die Closure. Address:

**JUNKIN SAFETY
APPLIANCE CO., INC.**
936 W. Hill Street,
Louisville, Ky.



JUNKIN SAFETY GUARD



demountable with ordinary hand tools.

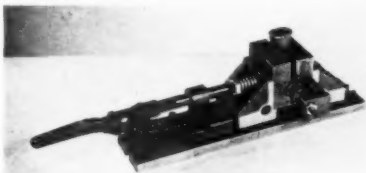
A notable feature of Champion Wheels is the sealed and welded ball bearing hub which cannot lose balls or get out of alignment. There are no nuts, collars, or washers to wear or get out of adjustment. All parts are heat treated. The Champion Iron Works Inc., 2223 Gratiot Ave., Dept. JJ, Detroit, Mich.

NEW BENCH VISE COMBINES SPEED AND PRECISION

A new model vise and clamping fixture, the Equi-Grip Speed Vise, Model A-3, with multiple production applications, has been designed by the George-Anderle Manufacturing Co.

The jaw pressure of the Equi-Grip Vise is actuated by means of a toggle clamp with single lever action. A slight down pressure on the toggle lever clamps and locks the jaws. To unlock, a short upward motion is sufficient. The toggle action is transmitted to the jaw through a heavy compression spring. The pressure is controllable by a pressure nut through the entire range from zero to the full compression of the spring. This feature is

especially useful in fast production of parts which can be distorted, since the operator can adjust the vise for a work piece to the correct pressure for holding without distortion.



The Equi-Grip is entirely hand-operated; the operating motion is downward and away from the work, rather than horizontal and forward. The component parts of the vise are precision ground, so that its sides are flush with the base, and at perfect right angles to the top and bottom surfaces. This permits the unit to be laid over on either side for right angle operations without resetting the work piece. The George - Anderle Manufacturing Co., 2116 Salem Ave., Dept. BB, Dayton, Ohio.



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DEPENDABLE

ELECTRIC HAMMERS

Will Drill - Cut and Chip Concrete and Masonry IN 1/10th THE TIME

it takes you to do the same jobs with a hand hammer and drill.

Their 3600 blows per minute from the ordinary 110 volt light socket speed up the job.

Write for illustrated folder.

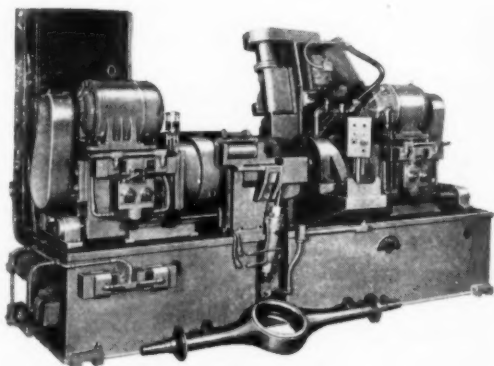
SYNTRON CO., 300 Lexington, Homer City, Pa.



AUTOMATIC DRILLING MACHINE FOR TRUCK AXLE HOUSINGS

An automatic drilling machine for truck rear-axle housings is announced by the Snyder Tool & Engineering Co. This unit performs in a single automatic cycle a number of drilling operations. The entire work-cycle, including clamping, drilling 21 holes, and releasing, requires 15". Operating in an automatic sequence, a movable bushing plate and two individually-actuated hydraulic clamps locate and clamp the work-piece in the fixture. The clamps are mechanically locked to hold the parts securely in place while machining.

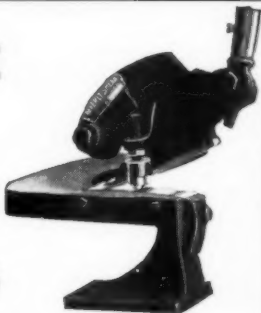
The parts are engaged on the two banjo faces by two opposed pilot diameters which enter the banjo face bores. One pilot diameter is stationary, while the second is movable



and is wedge-locked in place by a separate cylinder after entering the bore.

Two Snyder self-contained hydraulic

CUT ANY SHAPE BETTER with BEVERLY Throatless SHEARS



The No. B-3 BEVERLY Bench Type Shear with Ball Bearing Hold Down handles 3/16" or No. 10 gauge stainless steel. This sturdy shear weighs 58 lbs. and is equipped with H. C. H. C. Blades for heavy duty service.

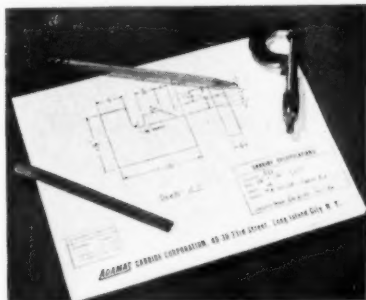
Let us send Bulletins giving full details on the BEVERLY LINE —

THE BEVERLY SHEAR MFG. CO., 3005 W. 110th Pl., Chicago 43, Ill.

units, each carrying a ten-spindle head, are mounted opposed to each other and are used to drill the 20 holes of the banjo faces. A single spindle unit mounted on an inclined angle, and behind one of the Snyder self-contained units, is used to drill the breather hole. This unit is also hydraulically actuated to and from the working position to permit loading and unloading of parts.

High speed drills are employed, operating at 60 s.f.m., with an .008" feed per revolution. Hydraulic feed for all tools includes rapid advance to working position, working feed and rapid return. Further information is available from the Snyder Tool and Engineering Co. 3400 E. Lafayette Ave., Detroit, Mich.

primarily to assist in the ordering of preformed blanks. The standard tolerances indicating over-size manufacturing allowances and a specification box with space for all required information are found on each page. Carbon copies of all



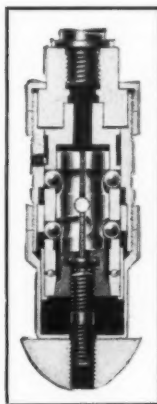
ADAMAS CARBIDE DEVELOPS SKETCH PAD

The Adamas Carbide Corp. has initiated a program of assistance to carbide users aimed to simplify and facilitate the use of cemented carbides. The firm has developed a useful and ingenious item called the Adamas "Sketch and Spec" Pad. This bound pad has a generous supply of cross-section paper, and is designed

drawings can easily be made for record keeping. Further details will be furnished by the Adamas Carbide Corp., Dept. BB, 1819 Broadway, New York 23, New York.

HIGH SPEED STUD DRIVING the NEW WAY

● A FAST OPERATION TIMED IN SECONDS



The Titan Automatic Self-Opening Stud Driver is the only tool of its kind to incorporate an automatic take-up for wear on the jaws. As the threads in the jaw become worn, the action of the driving balls on the jaw drive shoulder tends to pull the jaws up in the taper nose bushing, causing them to close in on the stud. The illustration shows how the jaws are locked in full register, how the tool comes down and how the cycle reverses. Another feature is the inexpensive method by which the clutch can be renewed—by pressing the cam ring out of the main ring, reversing it, and pressing it back. This gives double wear at half the cost.

Affords accurate maintenance of projection heights. Can be used with any air or electric drill or drill press.

It is not necessary to stop rotation at any time, thus saving all the time formerly used in screwing on and off the stud.

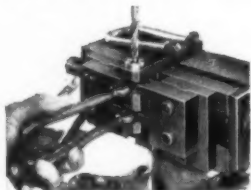
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TITAN TOOL CO.

Production Tools
47 Main Street
FAIRVIEW, PA.



**One of Many Set-ups
on the
"JOHNS" DRILL JIGS**



Maximum Production
Low Tooling Cost
Plenty Chip Room
Visibility
Accurate

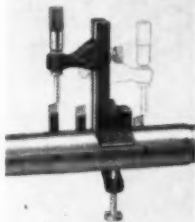
Send us your drilling problem

HEUSER MFG. CO.

1638 N. Paulina St., Chicago 22, Ill.

SAVE TIME

**WITH
BARTELT
GAGES**



Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to fixed base. Make settings in one step—eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

BARTELT ENGINEERING CO.

1218 Portridge Ave.

Beloit

Wisconsin

NEW A-C INDUSTRIAL ARC WELDERS

A large, illuminated current indicating scale is the dominant feature of a new industrial type a-c transformer welder, announced by the Hobart Brothers Co. The scale is uniformly calibrated so that the extra large figures are evenly spaced from minimum to maximum welding heat settings.

These welders are all of the moving coil type, with no adjustable magnetic paths. Adjustment of current is made by means of a knob on a pressed steel disc that serves as the top cover of the case.

The units have a high full load efficiency and a low no load input. All coils are made of glass covered copper strap and all insulation is Class B. The circuit reactance and the no load voltage are so balanced as to make arc starting prompt for any thickness of metal, without requiring special relays for this purpose. Capacitors are built in the units for power factor correction.



All connections are enclosed in the case; power supply cables pass through the rear of the case to a three-stud panel, accessible through a door that remains closed when the set is in use. The welding cables pass through two holes in the front of the case to a two-stud panel, similarly accessible. There are no electrical connections between the power lines and the welding cables. A heavy layer of mica between primary and secondary coils prevents the possibility of line

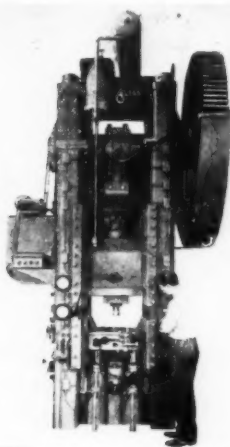
voltage carrying across to the welding circuit, making these units very safe.

The case is of 16 gauge steel, rolled and welded, with drip-proof circumferential louvres at the top. A fan at the bottom of the case draws fresh air through the louvres at the top, and expels it at the bottom. Absence of perforations in the walls of the case avoids side escape of air.

These welders are offered in 300 and 500 ampere sizes for operation on single phase, 60 cycles supply current (50 cycles, if desired), either 220/440 volts, or 550 volts. The Hobart Brothers Co., Box 13, Troy, Ohio.

BLISS PRESS COMBINES TRIPLE HYDRAULIC LOWER MOTION

A new briquetting press that extends metal powder application to large, irregular cross-sections has been developed by the E. W. Bliss Co. Embodying a unique operating principle which combines the advantages of triple hydraulic lower motion—floating die table, core rod and stripper—built into a 345-ton mechanical press, the Bliss No. 309 Briquetting Press produces large, complex powdered metal parts beyond the size range and capacity of available single-action mechanical or hydraulic presses, and to close tolerances.



Uniform density throughout the finished part is assured by the hydraulically controlled floating die table and core rod

Monarch Precision SHAPLANE Radius Tool



Patent Pending

**For Lathes, Shapers, Planers, Boring
Mills, etc. Min. Rad. 1/2" to Max.
Rad. 2 1/2".**

C. B. TEETER Machine Specialties

**4470 Oakenwald Ave., Chicago 15, Ill.
Phone Drexel 3571**

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THE INTERNATIONAL
AMPHITHEATRE
CHICAGO, ILL.
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**GROB BROTHERS
GRAFTON, WISCONSIN
CONTOUR METAL BAND SAWS
CONTINUOUS FILING MACHINES
FRICTION SAWS—BUTT WELDERS**

rams, which recede against pressure that is predetermined by independent adjustments. This has the effect of squeezing the powder from the top and the bottom.

The mechanically actuated slide has a 10" stroke, adjustable to 5"; it carries an adjustable cam which actuates the movement of the powder hopper. The speed of the slide can be adjusted from 6 to 9 strokes per minute and from 9 to 18 strokes per minute by adjusting the speed control of a variable speed motor.

All hydraulic cycles are initiated by the mechanical cycle either by contact with the die table and core rod or by a rotary limit switch, except when the selector switch is set for "hand" operation, when the core rod and stripper may be moved up or down at will.

The mechanical cycle can be inched for set-up, single-stroked for tryout, or run continuous for production. The flexible electric timing devices make possible many combinations of the three lower motions. The table and core rod can be kept stationary if desired. Further information can be obtained by request to E. W. Bliss Co., 450 Amsterdam Ave., Detroit 2, Mich.

PLASTIC COATED, DRAFTING BOARD COVER

A new aid to drafting efficiency is on the market, the Bruning Co.'s No. 450 plastic coated, washable green drafting board cover paper. This material is heavy enough to cover pinholes and uneven surfaces on the drafting board, yet flexible enough to bend around the edges of the board. The paper is washable; dirt and smudges wash clean from the plastic coat, enabling it to retain a fresh appearance over a long period of time. The glossy finish makes it difficult for dust to adhere to the paper.

The No. 450 Paper lies flat on the drafting board, without curling or wrinkling, making it extremely durable. Its light green color minimizes glare and reflection, reducing eyestrain. Due to its hard, smooth surface, the cover reduces scoring marks on original drawings to a minimum, resulting in clean, sharp tracings. Additional information on this drafting board paper is available from Charles Bruning Co., Inc., 4754 Montrose Ave., Chicago 41, Ill.

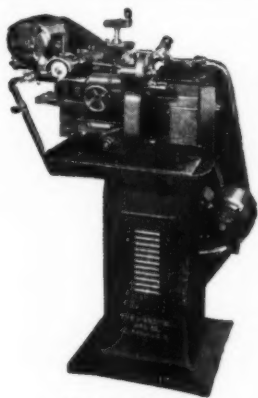
GRINDS STRAIGHT OR SPIRAL FLUTES FROM SOLID

●
IT SHARPENS SAWS, TOO

●
NO SKILL NECESSARY

Ideal for fluting and gunning of taps, reamers, angular and milling cutters. Sharpens small metal cutting saws singly or in gangs.

Its completely automatic. Set the reamer or tap in the machine and forget it. Within a few minutes an accurately ground straight and spiral flute is finished. Ask for Bulletin 50F.



50F AUTOMATIC FLUTE GRINDER

THE WARDWELL MANUFACTURING CO.
3165 Fulton Rd. Cleveland 9, Ohio

ARTUS ARBOR SPACERS

The **COLOR** tells
the **THICKNESS**

ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder.



CONVENIENT TRIAL OFFER

Handy Spacer Assortment

10 ea. .001 — .0125 thick
5 ea. .015 — .030 thick

100 SPACERS IN ALL

7/8" — \$3.10 1 1/4" — \$3.80
1" — 3.35 1 1/2" — 4.70

Other standard sizes also available.

ARTUS PLASTIC SHIM



AND FEELER GAUGE STOCK

The **COLOR**
tells the
THICKNESS

• Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting 5"x20" sheets. Special sizes to order. Handy assortment, shim stock. 12 colors—12 thicknesses (.001-.030). Bound together.....\$4.25

Illustrated Folder Free.

Immediate Delivery on Spacers, Gaskets, Shims, Large Slitting Saw Spacers.

INDUSTRIAL PRODUCTS SUPPLIERS

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INDUSTRIAL PRODUCTS SUPPLIERS

106 Water St., Dept. H, New York 5, N. Y.

Gentlemen:

Please send me:

- ☐ Handy Spacer Asst.
☐ Handy Shim Stock Asst.
☐ Free Illustrated Literature

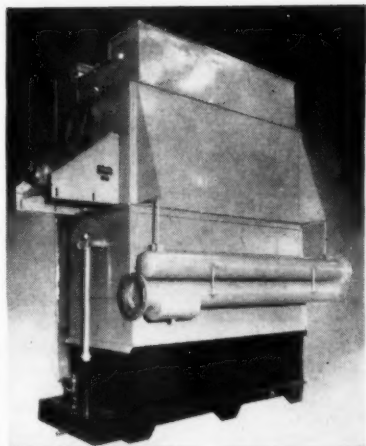
NAME

COMPANY

STREET

CITY

STATE



NIAGARA Aero After Cooler Saves Expensive "Wear-Out" of Air Tools

Water in compressed air lines is more than a nuisance; it costs thousands of dollars yearly in worn-out tools and equipment, or broken air tools caused by water hammer, abrasion and washed-out lubricants.

Protect your air tools and compressed air processes with drier compressed air using the Niagara Aero After Cooler. Always keeps air in compressed air lines below relative surrounding temperature, prevents condensation and provides air with one-third to one-half the moisture content of water-cooled air. Water savings will pay for the installation.

Write for Bulletin 98-MT.

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Air Engineering
405 Lexington Ave., New York 17, N. Y.
Field Engineering Offices in Principal Cities

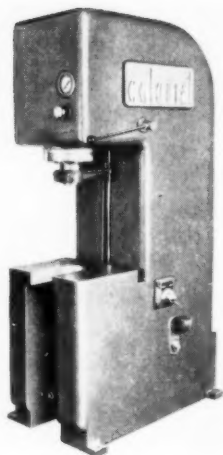


AIR ENGINEERING EQUIPMENT

10-TON MODEL ADDED TO ASSEMBLY PRESS LINE

To its line of standard hydraulically operated assembly presses, a 10-ton model has been added by the Colonial Broach Co. With a maximum adjustable stroke of 12", the press has a power stroke speed of 180" per minute, with a return stroke of twice that amount. Ram speeds are adjustable over a wide range. Working pressure is 1200 psi, maximum, and is adjustable to any desired amount below this. Pressure can be selected and maintained exactly through a direct reading pressure gage adjacent to the pressure control regulator. The machine is compact, requiring only 25" by 42" of floor space; operation is through a $7\frac{1}{2}$ hp motor.

Standard equipment includes hand operating control and pressure gage. Foot pedal control, for use where operators need both hands free, is available as extra equipment, as are various pressure and speed controls. The Colonial Broach Co., Box 37, Harper Sta. Detroit 13, Mich.



NORTON ABRASIVE POINT ASSORTMENT

A handy kit of mounted points is announced by the Norton Co., Worcester,

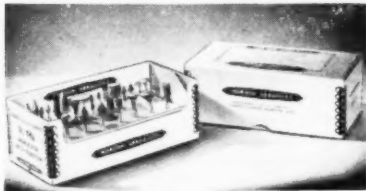
Mass. Designated as the Norton No. 16 Mounted Point Assortment, it is made up of one each of the 16 most popular sizes and shapes, packaged in an ingenious



Production goes up! costs come down in plants where Schauer Speed Lathes are used for polishing, lapping, deburring, or finishing small metal or plastic parts. Schauer Speed Lathes are production necessities. There is a size and type especially adapted for any secondary finishing operation. Low in cost; they pay for themselves many times over. For increased production of a better product, at lower cost, investigate Schauer Speed Lathes for your plant. Write for Catalog 440.

THE SCHAUER MACHINE CO.
2064 Reading Rd. Cincinnati 2, Ohio

box which serves as a shipping container and also as a handy holder on the bench while the points are in use. Each point has its own location in the box, stamped



with the number of the point, so as to facilitate reordering of any particular shape. The kit is useful for tool and die makers who need a variety of shapes and sizes in a carefully selected assortment.

The points are made of fast, cool cutting No. 38 Alundum abrasive, vitrified bonded, and strongly cemented on steel spindles.

TOOL HOLDER ELIMINATES GUESSWORK IN LATHE SET-UP

An accessory which eliminates approximations and waste in turret lathe set-up operations has been designed by the Biltmore Machine Tool Co. The device, called the Single Cutter Adjustable Tool Holder, can be fitted to any turret lathe. It requires only a few seconds to set the cutter for each new cut, by means of the attached micrometer adjustment dial control, which also serves as a tool release on backing off. Turning the dial a single graduation moves the cutter exactly .001"; when the desired position is attained, the cutter is locked in place.

Besides speed and accuracy of control, the nearly vertical position of the cutter lines up its cutting edge with the end grain of the steel, enabling the cutter to take a sharper edge, as well as extending its durability.

Further data is available from the Biltmore Machine Tool Co., 1506 Central Tower Bldg., Dept. BB, Akron, Ohio.

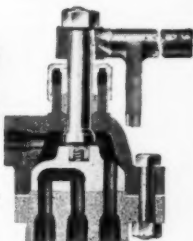
Nicholson Catalog 546 Shows **FAST ACTING • SLOW WEARING CONTROL VALVES**

for Every Operating Purpose

Featuring specially treated seats that don't cut out, Nicholson cylinder control valves are heavy-bodied, generously packed, fast-acting units, recognized for the way they stand up. Metal combinations for specific needs. Lever, foot, solenoid, motor types for all mediums. Pressures to 5000 lbs.

REPRESENTATIVE INSTALLATIONS

**Molding Machines • Control
Instruments • Cranes • Elevators
Presses • Hoists • Rubber
Machinery • Gates • Dumps
Brakes • Clutches • Bus Doors
Lifts • Locomotives**

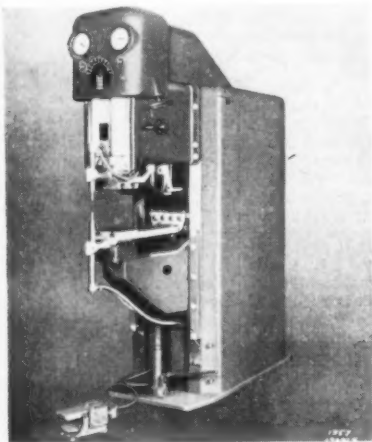


W. H. NICHOLSON & CO., 117 Oregon St., Wilkes-Barre, Pa.

Valves • Traps • Floats • Steam Specialties

NEW PRESS TYPE SPOT AND PROJECTION WELDERS

A new line of roller-head, press-type spot and projection welders, ranging from 50 to 500 KVA, is announced by the Progressive Welder Co. Features include adaptability to continuous high production runs, and the handling of various types and sizes of work on a job-lot run basis. This has been achieved by designing the machines for high speed operation



while providing for rapid change-over, required when welding miscellaneous work, by the arrangement of knees, welding arms, platens, electrode holders, etc.

The versatility of the new units is due to the new type frame construction. The frames are designed in two sections.

Lassy SINE BAR

Hardened & stabilized. Both sides square & parallel to work surface. Allows attaching to angle plate.

The one sure way to locate and check work fast and accurately when an angle is involved.

Price in case **\$28.00**
Lapped finish

Send for circular

LASSY TOOL CO.
PLAINVILLE, CONN.

The forward section, which takes the high stresses incident to resistance welding with high pressures, is heavily reinforced, providing as absolute rigidity as possible. To this section are attached the head, knee, platens and arms. The rear section, lighter in weight, is a removable sheet metal enclosure; thus the interior of the machine is accessible for maintenance.

The anti-friction head construction is responsible for the speed and accuracy of the machine. The ram is of strong light alloy for low inertia and high operating speed, and is supported and guided by eight pre-loaded anti-friction rollers. This design prevents the tendency for ram deflection when a long stroke is used.

Operation is obtained through air or hydraulic actuation, on all sizes up to 250 KVA. On larger machines, hydraulic is standard. All sizes have available throat depths of 18, 24, or 30" for projection welding, and 18 and 36" for spot welding.

50 and 75 KVA units are offered in two styles: spot and projection types. The projection type is convertible for spot welding by adding necessary equipment. The straight spot welder is convertible to the projection type, although requiring the addition of a projection welding type lower knee and platens. The Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.

PORTABLE HYDRAULIC SHEAR SOLVES CUTTING PROBLEMS

Development of a special type of portable hydraulic shear has effected a solution to the problem of production cutting of assembled parts which cannot be placed in a power saw or otherwise held for cutting. The shear illustrated was designed for clipping off the ends of 1" x 3/8" copper bars and is capable of exerting a 12 1/2 ton shearing force. This type of

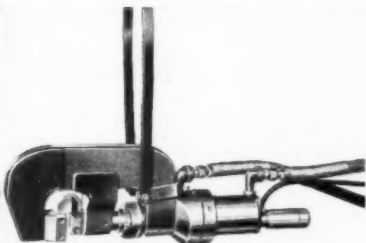
Save Space and Lifting

Yohe Racks take less floor space—hold more stock and require less lifting. Four arm rack, 51" high stacks, 10,000 lbs. Five arm rack 57" high holds 12,000 lbs. flat or round stock—at safe lifting heights. Use against wall or back-to-back in center of room.

Let us send details and prices.

WM. S. YOHE SUPPLY CO.
503 Mahoning Rd., N.E. Canton, Ohio

shear has application in numerous places where hand hacksaw work is now required to finish assembled parts. The shear comes in capacities up to 100 tons with specially designed yokes for work in "hard-to-get-at" places.



Control is by a push button on the shear which is connected to a hydraulic pressure generator. Depressing the push button starts the shear on an automatic cycle in which the blades close on the work at low pressure, then go through the cutting stroke at full pressure, then retract after cutting is accomplished. To repeat the cycle, the push button is released and depressed again. Releasing the button at any point in the cycle effects instant return of shear to starting position for safety. The shear is a new product of the Hannifin Corp., 1101 So. Kilbourn Ave., Chicago 24, Ill.

CYCLONE CHAIN HOISTS FEATURE LIGHT WEIGHT

An announcement by the Chisholm-Moore Hoist Corp. describes a line of high speed hand operated hoists that are 96% mechanically efficient. Through the use of steel and aluminum alloys, weight has been reduced nearly 45%, compared to hoists of similar capacity; strength and durability have been increased, and excess bulk eliminated.

A further feature is a reduction in the number of component parts. It is estimated that the hoist has 42% fewer parts than current hoists of the same capacity. All rotating parts are fitted with precision ball bearings that have double sealed-in lifetime lubrication.

Improvements have also been made in the lift wheel, load chain guide, gearing and load brake. Attention was given to reducing the pull required by the operator to lower the load.

Known as the Cyclone Model M, the new high speed hoist is available in four standard capacities, 1/4, 1/2, 1, and 2 tons.

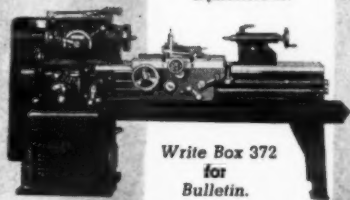


All models are equipped with "Herc-Alloy" steel chain. Model M hoists information is available from Chisholm-Moore Hoist Corp., Tonawanda, N. Y.

CARROLL AND JAMIESON LATHES 15" AND 16"

12 Speed Geared
Head Motor Drive
Timken Mounted
Spindle.

Modern Design—
Liberal
Dimensions.

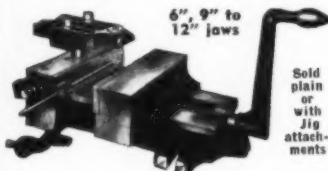


Write Box 372
for
Bulletin.

**THE CARROLL & JAMIESON
MACHINE TOOL CO.**

CLEVELAND, OHIO, U. S. A.

Plain Vise or as Jig or Fixture



Graham Multi-Purpose Vise

In sizes up to 150 lbs. the Graham Multi-purpose Vise serves hundreds of plain or repeat-operation needs on drill press, radial, planer, shaper, miller, grinder.

"Adjust-angle" KNURL HOLDER

Many patterns using only straight knurls



With shank made to fit your lathe turret (or tailstock), this tool has patented adjustment of knurls to various angles, enabling the same pair of straight knurls to produce a variety of straight, spiral or checkered patterns on work up to 2½" dia.

Request Bulletin 41

giving full details of applications and prices.



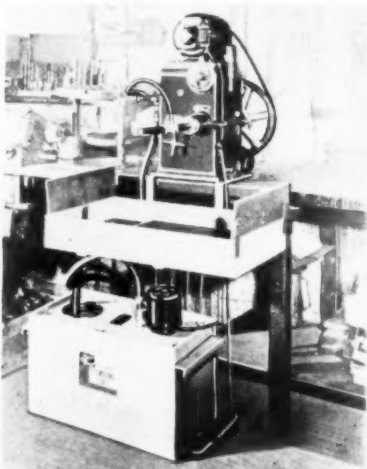
GRAHAM MFG. CO.

51 Bridge St., East Greenwich, R. I.

WET-CUTTING CONVERSION UNIT FOR SUNNEN HONES

A new wet-cutting conversion system for use on Sunnen Bushing Grinders is announced by the Gray-Mills Corp. The unit can be attached to the grinder in twenty minutes without cutting or drilling.

A fractional hp centrifugal pump, unaffected by abrasives, is mounted in a 12-gallon baffle-equipped coolant tank; it pumps cutting oil to the work through oil-resisting neoprene lines. A flexible metal nozzle, for directing the flow onto the work, with a flow control valve and attaching bracket is included.



From the work, the oil flows to a return pan which slides in place beneath the mandrel. The pan is supplied with removable splash shields. Here the bulk of the abrasives is separated from the fluid by a baffle plate before flowing back to the pumping unit for recirculation. The Gray-Mills Corp., 1948 Ridge Ave., Evanston, Ill.

NITROFLEX INDUSTRIAL PROTECTIVE GARMENTS

The Industrial Products Co. has introduced a new line of protective apparel for industrial use. Designated as Ipco "Nitroflex" Aprons and Sleeves, they

DIAMONDS
FOR WHEEL-DRESSING TOOLS

DIAMONDS
FOR THREAD GRINDING TOOLS

DIAMONDS
FOR ALL INDUSTRIAL PURPOSES

KOEBEL

KOEBEL DIAMOND TOOL CO.
9456 Grinnell Avenue, Detroit 13

WHEN YOU BREAK A TAP YOU NEED A

WALTON TAP EXTRACTOR

Prices
range
from
\$1.50 to \$2.20
for the
popular sizes.



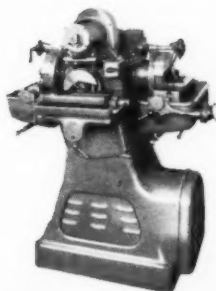
The fastest, easiest,
safest and most eco-
nomical way to re-
move a broken tap
from the work is
with a WALTON
TAP EXTRACTOR.

**No Mangled Threads—
No Scrapped Work—
No Frayed Nerves**

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30-Day Free Trial Offer

THE WALTON COMPANY
94 Allyn Street Hartford 3, Conn.

HOW TO GRIND CARBIDE CUTTING TOOL BITS ECONOMICALLY



Here's tool grinding at its best!

Employing 3-step progression—rough, semi-finish, and finish or hone—on one machine, this LeMaire 3-Wheel Grinder produces keener edge in fraction of time. Because tools go to diamond wheels in better condition, life of diamond wheels is considerably lengthened. Both labor and wheel costs are reduced—time is saved—production is increased.

Wouldn't you like to know more about this remarkable 3-Wheel Grinder? Send for descriptive folder.

LeMaire Tool & Mfg. Co. 2657 S. Telegraph Road
Dearborn, Michigan

Designers and builders of unit and way type machines for single or multiple spindle drilling, boring, reaming, tapping, etc.—Twin Ram Hydraulic Units—Match-It Gear Chucks.

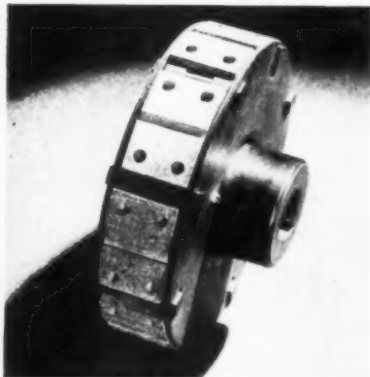
are made of a clear, frosted, plastic material for protection against most acids, caustics, oils, and solvents. The aprons are light, flexible, and comfortable wearing, although the material is extremely tough.

The aprons contain no stitching, . . . no seams to leak, . . . no threads to burn through. They are fitted with reinforced grommets, and are furnished with tubular laces of slight elasticity, which add to wearing comfort without binding. The sleeves are 14" long, well-patterned, and fitted with an adjustable elastic band at both ends.

The Nitroflex industrial aprons and sleeves are furnished in three weights: light, medium and heavy. Industrial Products Co., 2906 N. Fourth St., Philadelphia 33, Penna.

NEW MERCURY CLUTCH

A mercury-actuated clutch developed by Mercury Clutch Corporation of Canton, Ohio, makes possible automatic starting of air compressors. The clutch permits the driving motor to attain full speed before the compressor turns, eliminating the need for pressure release valves. This automatic clutch incorporates a "time delay" factor which retards the engagement



for a second or more, long enough to permit the motor to come up to full speed before any load is applied. The motor is then able to bring to bear its greatest torque plus the inertia of its rotor to start the load. Mercury (Quicksilver) is used as the control medium because of its high

specific gravity. Centrifugal force acting on a small amount of mercury produces hydraulic pressure which is dependent upon the "head" of mercury rather than the amount. This pressure is utilized without the use of levers or other mechanical means, to cause the engagement of the friction elements of the clutch. The manufacturer has developed standard clutches for all types of electric motors up to 15 hp. and for internal combustion engines.

COMPACT SOLENOID AIR VALVE

A compact, 3-way, 3-port, solenoid operated air valve for controlling single action air cylinders actuating machine tool operation, is announced by Automatic Valve Inc. SV-3 is so compact that it can be attached close to air cylinders, eliminating excessive piping and air waste. Mounted in any position it can easily be serviced without disturbing the piping.

SV-3, normally open or closed, is a balanced piston type valve-pressure sealed and reversible in servicing and assembly. There are no metal contacts, due to ring type of seals. SV-3 is available in $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " sizes. Valves operate on pressures from 5 lbs. to 150 lbs. psi. Solenoids are the same type and size for all makes of Automatic Valves. Further information will be sent on request to Automatic Valve, Inc., 37415 Grand River Ave., Dept. BB, Farmington, Mich.

QUEEN CITY VISE FITS SHAPERS FROM 16" to 32"

Cincinnati Machinery Co. announces the new Queen City Shaper Vise for use on any size or make shaper from 16" to 32". The accessory holds work in place for all standard shaper operations, a heavy duty, single screw, parallel jaw vise, with a graduated swivel base. By releasing two bolts, the vise swivels to any angle, and locks firmly in position. The screw passes through both movable and solid back jaw, followed by the end nut and the keyed washer to prevent loosening of the screw. The steel-inserted jaws are $11\frac{1}{2}$ " wide, and $2\frac{1}{2}$ " deep; maximum opening is $13\frac{1}{2}$ ".

The base of the vise is 12" x 14". The unit is furnished complete with a tightening wrench. Net weight, 262 lbs. Cincinnati Machinery Co., 219 East Second St., Cincinnati 2, Ohio.

PNEUMATIC OPERATING EQUIPMENT FOR DRILL PRESSES

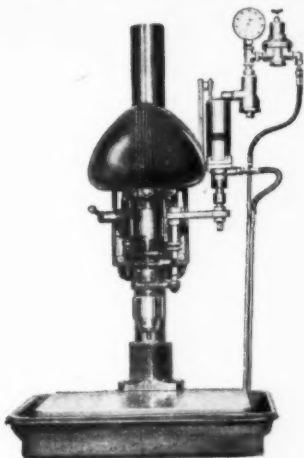
Supplied in the form of a kit, this pneumatic operating equipment is "pre-engineered" for quick installation on drill presses used for production drilling. Spindles thus converted to air-powered operation increase production and lengthen tool life.

The kit, designated as Drill Press Kit No. DC-40730, consists of an operating assembly (including air engine, pressure gage, pressure regulator, exhaust valve, and cushioning plug), together with foot-operated control valve, air strainer, cut-out cock, and flexible hose.

The engine provides controlled air power which can be adjusted to suit any drill size or stock, and to permit maximum pressure and speed within safe limits. Drill press production can be stepped up considerably, while drill breakage is reduced and less frequent sharpening is required.

The pre-set pressure and feed, held uniform by an air engine control enable inexperienced operators to turn out expert production. Since the control of the foot valve leaves both hands free, the operator can load and unload the fixtures faster.

Detailed information on this Drill Press Kit is given in Bulletin DC-28, obtainable



from the National Pneumatic Co., Rahway, N. J.



Designed for modern production requirements. Saves time, effort and motion. Has a two way micrometer adjustment with locking device to assure absolute cutting accuracy.

Kutmore Hollow-Mills may be had with straight or taper shanks, high speed or Carbide Tipped blades. Insist on Kutmore for accuracy, speed and economy. Prompt delivery. Write for Catalog No. 15.

Carl Wirth & Son

1625 CLINTON AVE. N.
ROCHESTER 5, N. Y.

TWO NEW PRODUCTS BY BLACKSMITH: TAP AND DIE HOLDER, FLOATING DIE HOLDER

Beverly Blacksmith, engineers and manufacturers, announce the production of two new accessories, their Combination Tap and Die Holder and the Floating Die Holder. The first is a tool which offers considerable flexibility, since as



a Tap Holder, it will accommodate a range of tap sizes from 3/48" to 5/16" inclusive; as a Die Holder, it will take any standard 1" O.D. die. An adapter is available which enables the tool to ac-

commodate the 13/16" O.D. dies as well as the 1".

The Floating Die Holder, illustrated, consists of a unique clutch arrangement which simplifies threading in a lathe or drill press. It will accommodate any 13/16", 1", or 1 1/2" O.D. die, and can be operated through any 1/2" capacity chuck in either a drill press or the tail stock of a lathe. It is a self-releasing type, and can be set up in less than a minute with a minimum of effort. The accessory has a positive lock which gives the desired tension instantly, and maintains equal tension in either direction. An outstanding feature, according to the manufacturer, is the tool's adaptability to thread up to a shoulder on a work piece without the necessity of stopping the machine.

Further information on either of the above tools will be furnished upon request to Beverly Blacksmith, 7418 Rogers Ave., Dept. BB, Chicago, Ill.

31 TON BACK GEARED PUNCH PRESS

A new back-geared 31 Ton punch press with design features adapting it to many shop requirements is announced by Diamond Machine Tool Company of Los Angeles. It differs from the former 30 Ton model by the addition of the back

IT'S HERE!! THE BUFFALO PNEUMATIC CHIP GUN

**A NEW METHOD OF REMOVING
CHIPS FROM BLIND DRILLED AND
TAPPED HOLES.**

Eliminate the danger to your workmen from flying chips by removing your cuttings with the BUFFALO PNEUMATIC CHIP GUN. Simply place the nozzle over the hole, release the air by thumb pressure and the cuttings are deposited in the body of the gun.

SAFE!

CLEAN!

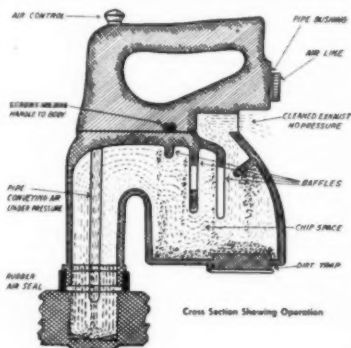
EFFICIENT!

Write for Bulletin No. 1011 today

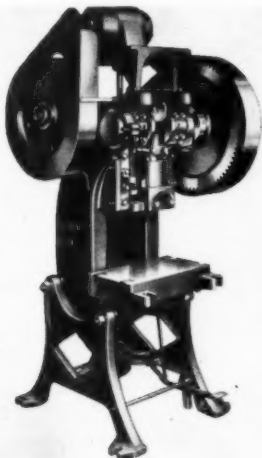
BUFFALO MACHINERY CO., INC.

838 Grant Street

Buffalo 13, New York



gears, illustrated, and in even stronger frame design. Bed area from front to back is 13 inches and from right to left 22 inches. Standard stroke is 3 inches although shorter or longer strokes are provided upon request. Overload protection is rated at 100%.



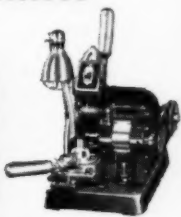
The 31 Ton Diamond press is mounted on heavy semi-steel cast iron legs and a cradle arrangement permits operation of the press at any desired degree of inclination. Gibs, sliding surfaces and crank shaft are micro-finished to provide maximum smoothness of operation and longest possible wearing life. All stock parts are interchangeable, requiring no special fitting in case replacement becomes necessary.

GAGES AT ½ PRICE

NEW Vard thread gages to 1½" . . . plug, ring, snap. Our complete stock at 50% off list. Specials at price of standards. Write for latest stock list.

PAUL B. SLATER CO.
1025 Santa Fe Ave. Los Angeles 21, Calif.

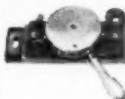
If it's a SMALLPART... Mill it with a New Rouse Hand Miller



\$98 (Without Fixtures)
F.O.B. Chicago, Motor Extra

NEW
Rouse
**HAND
MILLER**

Rouse
**Fixture Set-Ups
that Speed Pro-
duction.**



No skill is required. Anyone can quickly learn to operate this unit with speed and accuracy. It's ideal for making light cuts in brass, aluminum, steel and other metals . . . also for rounding and burring cast iron and steel.

Many manufacturers use a Rouse Miller for second operations on plastics.

With Rouse Fixture Set-Ups, productive capacity is greatly increased for a large variety of

parts for instruments, electrical work, aviation components, etc.

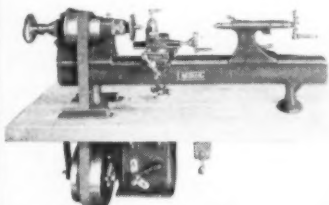
Available for immediate shipment.
Write for illustrated circular and full details.

**H. B. ROUSE
& COMPANY**

2216 N. Wayne Ave. Chicago 14, Ill.



Integral Drive Precision Bench Lathes. Double-taper headstock bearings of highest accuracy, or best precision pre-loaded ball bearings. Two good sizes $\frac{3}{4}$ " and 1". 30 Precision attachments available.



Open Cone Lathes world-known. Four sizes, with compact under-bench Motor Drive Unit.

Stark Precision Bench Milling Machine.

Plain and Spiral Models



"ELECTROBLAST" High Speed Muffle Furnace. Two excellent small sizes.

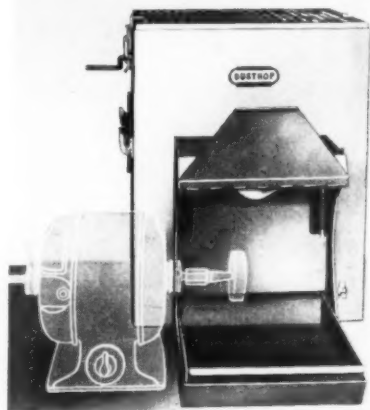
Stark Tool Company

WALTHAM · MASSACHUSETTS
ESTABLISHED · 1862

Originators of the American Bench Lathe

PORTABLE LABORATORY TYPE DUST COLLECTOR

A new portable bench-type dust collector for laboratory and small shop dust collecting from buffers, polishers, and grinders, is added to its line of Dustkop dust collectors by the Agat-Detroit Co. Especially suited for laboratories where space is limited, and where quiet operation yet high dust storage is required, the Model No. 330 Dustkop is entirely self-contained, and requires no installation, other than plugging in to a light outlet.

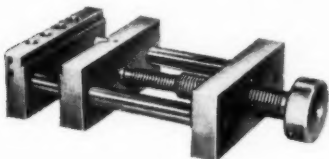


A $\frac{1}{4}$ HP, 110 volt, single phase, 1745 rpm motor drives a fan capable of clearing chips and dust for grinding, lint and strings from polishing and buffing, as well as sludge from pumice and other wet finishing operations. The hood has a baffle and a light fixture, as well as two separate removable trays which eliminate mixing accumulated dusts from wet or dry work.

The size of the unit is 12" x 14" x 18" high. The hood and pan extend 13" in front of the cabinet. Weight of the unit is approximately 65 lbs. The Agat-Detroit Co., Main at Washington Sts., Ann Arbor, Mich.

MULTI-PURPOSE STEEL DRILL VISE

A rugged, accurate Drill Vise, made of hardened alloy steel throughout, is in production by Remco Products. The tool is extremely variable in its applications, since many types of drill jigs or fixtures may be made by adding a work stop and drill bushing plate to the vise. The Remco Vise has a jaw width of 6"; the maximum jaw opening is 6¼". The jaws have built-in parallels and vertical vee, and is



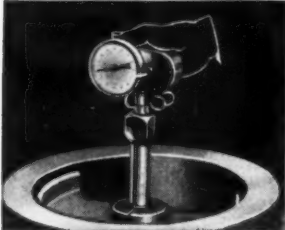
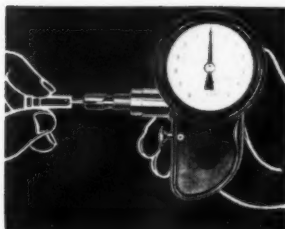
equipped with a compound Acme screw for quick, positive grip.

Specifications on this accessory are available from Remco Products, 131 Merritt Ave., Syracuse 7, N. Y.

AUTOMATIC CAM FIXTURE CLAMP

An improved Automatic Cam Clamp is announced by West Point Mfg. Co. The operation of the handle automatically advances or retracts the clamp strap to or from the work, permitting operation of the clamp with one hand, leaving the other free for loading or unloading stock. A special feature is the built-in rest block which makes the clamp a complete unit easily attached to the fixture by drilling three holes. The handle can be mounted in any position for the right or left hand operation. The long ball knob handle permits unusual leverage for holding the work tightly.

The Automatic Cam Clamp is made of alloy steel, cadmium plated. The strap, cam and pin are heat treated. Spherical washers with ground radii are used to compensate for irregularities in the work. The clamp can easily be adapted for operation by an air cylinder. Further information and full scale template sheets will be sent on request to the West Point Manufacturing Co., 19625 Merriman Court, Farmington, Mich.



"COMTORPLUG"

For gaging PRECISION HOLES

1/8" to 8" dia., to Fractions of .0001"

Comtorplug patented expanding internal comparator is rugged enough for use by machine operators, and bench inspectors, highly accurate for use by final inspectors. Exclusive features of self-alignment assure positive accuracy and uniform results by different users. Gives a fixed—not passing—reading to within .0001". Shows actual size of hole, detects front or back taper, out-of-round, bell mouth, etc. Exactly right for Quality Control programs.

Request 8-Page Bulletin 33



COMTOR CO.
62 RUMFORD AVENUE

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"COMTORGAGE", Precision External Comparator: Bulletin 30
COMTOR SURFACE SMOOTHNESS COMPARATOR: Bulletin 32
WALTHAM, MASS.

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DUB LIFE

PLUG GAGES WITH COLORED PLASTIC COLLETS (INSULATING)



**RED for
"NO GO"**

**GREEN
for "GO"**



DUB LIFE

Remember! — Colored Collets instantly identify plugs. They are weight reducing, lock securely and will not mar the finest finish.

United Precision Plug Gages are scientifically designed. They are made by skilled craftsmen from the finest gage steels. The latest in modern equipment for metal working and heat treating assures a high standard of perfection—dependable accuracy, maximum service at minimum cost.

UNITED PRECISION PRODUCTS CO.

SHABONNA, ILLINOIS

COLUMBIA POWER PRESS BRAKE

A motor-driven slide adjustment with both motor and controls readily accessible is an important feature of the Columbia Power Press Brake produced by Columbia Machinery and Engineering Corporation, Hamilton, Ohio. The slide can be adjusted out of parallel with the base, the magnitude of the adjustment showing on indicators located on each end.

The brake is operated by a multiple-disc friction clutch of special Columbia design and a highly-efficient friction brake.

The slide and base have been designed for strength and rigidity with a maximum permissible deflection of .001 inch per foot of machine width. The housings, slide, base and cross tie are fabricated from rolled steel to provide strength, rigidity and durability.

All gears are precision machine cut and operate in oil within an oil-tight case. First driving gears are helically cut. The eccentric shaft is a heat-treated high-carbon steel forging with eccentrics forged integrally with the shaft. All main bearings are lubricated by a positive centralized lubricating system.



The brake is of 120 tons capacity and operates at a speed of 30 strokes per minute. It will form mild steel in the following sizes: 7/16" by 4 feet, 5/16" by 6 feet, 1/4" by 8 feet and 3/16" by 10 feet.

The Columbia Power Press Brake is regularly furnished with a flywheel for belt drive but can be furnished for individual motor drive with a 10 hp 1800 rpm high-torque high-slip motor and completely enclosed V-belt drive.

ADJUSTABLE STROKE AIR CYLINDER

Anker-Holth Manufacturing Company of Port Huron, Michigan has recently developed an adjustable stroke air cylinder. The cylinder offers very distinct advantages when it is necessary to lengthen or shorten the stroke of the piston for different applications where the same amount of force is required. This type of cylinder might often be used in place of several cylinders of set stroke construction.

The photograph shows an Anker-Holth $4\frac{1}{2}$ " bore, foot mounting air cylinder provided with an adjustable stroke control feature for setting of any stroke length between the 8" maximum stroke and the 6" minimum stroke lengths of the cylinder.

In addition to the regular double acting piston for operating the piston rod, this cylinder is provided with a stop piston for setting of the required stroke by turning the hand wheel shown at right hand end of cylinder. The hand wheel acts as a nut over a threaded hollow center shaft which is grooved and keyed to the cylinder and cover and fastened to the stop piston.

Pipe inlet ports are provided in the rod end cover and in the outside end of the hollow center adjusting shaft for operating the double acting piston. A flexible hose connection must be used at the latter port to permit lateral movement of



the adjusting shaft. The stop piston is provided with a packing to prevent any leakage of air from this end of the cylinder through the adjustable stroke mechanism.

NUPLA Mallets with Interchangeable Tips



1. Will not mar or damage delicate surfaces.
 2. No sting, vibration or rebound.
 3. Will not "gash", mushroom or chip.
 4. Not affected by oil or gasoline.
 5. They are safety mallets—No explosion or fire hazard.
- Equipped with NUPLOCK (Pat. Pending)—a dependable Tip-Locking device.

When ordering state grade ("S"—Soft; "M"—Medium; "T"—Tough)

COMPLETE NUPLA MALLET									
Mallet Head			Head		Price		Mallet Head		
No.	Dia.	Wght.	Length	Each	Min. Pkg.		No.	Dia.	Wght.
100	1"	5 Oz.	3 $\frac{1}{2}$ "	\$ 2.00	6		250	2 $\frac{1}{2}$ "	2 Lb.
105	1"	8 Oz.	3 $\frac{1}{2}$ "	2.50	6		255	2 $\frac{1}{2}$ "	4 Lb.
150	1 $\frac{1}{2}$ "	$\frac{3}{4}$ Lb.	4 $\frac{3}{8}$ "	3.00	6		300	3"	3 $\frac{1}{2}$ Lb.
155	1 $\frac{1}{2}$ "	1 $\frac{1}{4}$ Lb.	4 $\frac{3}{8}$ "	3.25	6		305	3"	6 Lb.
200	2"	1 $\frac{1}{4}$ Lb.	4 $\frac{1}{2}$ "	4.00	6		307	3"	9 Lb.
205	2"	2 Lb.	4 $\frac{1}{2}$ "	4.50	6		308	3"	12 Lb.
207	2"	3 Lb.	4 $\frac{1}{2}$ "	5.25	4				

Extra Tips May Be Obtained For Replacements

ACME TOOL COMPANY

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When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

Precision TAPPING

*Leads
changed
in 90
seconds*



M & L PRECISION TAPPER

This is a fast rugged production tool capable of sustained accuracy. Flexible and adaptable, it cuts clean screw threads, handling up to $\frac{3}{4}$ " in non-ferrous metal and 0 to $\frac{1}{2}$ " in SAE steel. Class 3 and Class 4 gage fits and high production schedule are accomplished in normal operation even with unskilled help.

Tapping speeds are 95 to 350 rpm with reverse speed twice that of forward speed. Taps are guided by precision ground lead screws which are easily and quickly changed. Bulletin 143 gives full details.

**Dealers' inquiries
are invited**

LECKINGER
MACHINE AND EXPERIMENTAL CO.
716 N. Highland Ave., Los Angeles, Calif.

TOGGLE-ACTION CLAMP

A heavy, toggle-action clamp called the Jumbo is announced by Knu-Vise, Incorporated, Detroit. With a man's normal pressure on handle it is capable of exerting a pressure of 1,350 lbs. at the extreme end of the toggle bar.

By virtue of the ingenious design of the base, comprising an integral front bracket and a back support, the deflection at the spindle is not more than $\frac{3}{16}$ ". It is said to be the only big clamp which permits spindle to be adjusted longitudinally along toggle bar to accommodate various placements of work at pressure point without the necessity of changing original location of clamp.



The clamp is supplied with a complete spindle assembly, but this can be removed and replaced by any special pressure pad to meet the user's particular requirements.

In upright position, this clamp, catalogued as V-1100, measures $14\frac{5}{8}$ " in height, with overall length of $9\frac{7}{8}$ ", and weighs 6 lbs. It has a comfortable hand grip.

Like all other Knu-Vise clamping devices, this new clamp locks with characteristic toggle action when pressure is applied to work. The operation is quick and effortless.

COUNTERBORE HAS PRE-GROUND SUB-LAND PILOT

A new type of high speed steel counterbore is announced by Mohawk Tool Co., 21651 Dequindre Road, Hazel Park, Mich.

The new tool, known as the "lifetime", offers two features: (1) The blades are approximately five times as long as most counterbores affording unusually long life; (2) A radial-ground sub-land pilot is built into the entire length of the tool.



As the blades are sharpened a pilot already ground to size is automatically developed. If a long pilot is desired the blades can be ground back to provide it. If, on the contrary, a short pilot is required the pilot can be ground off to the desired length as the tool is used.

The tool is available from stock in fillister screw sizes up to 1" and larger on special order.

It is unnecessary to salvage off the end of the counterbore to re-establish a new pilot. Undercutting of the blades in sharpening can be easily done by any grinder hand without touching the pre-ground sub-land pilot.

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

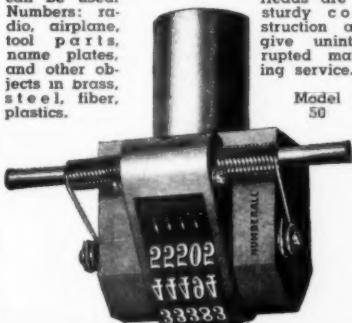
NAME PLATE DETAIL PRESS

Model 40 is for stamping details on name plates. Eliminates irregular and unsightly stamping on name plates, tags, etc. Available in 1/16", 3/32", 1/8", 5/32" size characters. Dials contain all the letters and figures, diagonal line, and sign, dash, period. No experienced operator required. Steel, zinc, brass, fiber, etc., can be indented with a name or number.



AUTOMATIC INDENTING NUMBERING HEAD • MODEL 50

Automatic indenting numbering head for consecutive or repeat numbering. 1/32" up to 3/8" high figures can be furnished in sharp face Gothic or shaded Roman figures. Prefix or suffix letter wheels. Bench, foot, or power presses can be used. Heads are of sturdy construction and give uninterrupted marking service.



NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



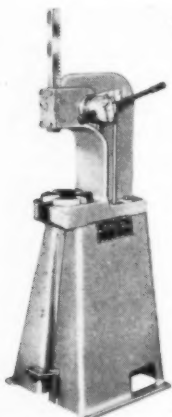
The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{3}{8}$ " to 1" diameters. Send for price list.

HEIMANN MFG. CO.

332 Lincoln Ave.

Urbana, Ohio

RODGERS FOOT-ACTUATED HYDRAULIC PRESS



A production press in which the ram is adjusted to the work by hand, and the

pressure applied by the foot, has been developed by Rogers Hydraulic, Inc. The Press, designated as Whitley Model No. 12, is one-man operated, and designed to step up production and reduce operator fatigue.

The unit is equipped with an all-steel clutch, coupled with compound gearing in the head, which allows a compensating precision feeling to the operator, permitting the accurate detection of incorrect tolerances during pressing operations.

Uses of the press include armature assembling, pressing studs in and out of irregular shaped castings without the need of fixtures, inserting bearings and bushings, light riveting, and with dies for punching, bending and shaping. The press is also useful for squeezing or pressing inside close corners in sheet metal fabrication.

Overall dimensions: height, $53\frac{1}{2}$ ", plus an extra 10" with the ram rack travel fully extended; base $20\frac{3}{4}$ " x 19". Distance from the floor to the work table is 31". Rodgers Hydraulic Inc., 7450 Walker St., Dept. BB, Minneapolis 16, Minn.

BEVEL GEARS

PROMPT DELIVERY

UP TO 12" DIAM. - 3 D. P.

CUTTING ONLY or COMPLETE GEARS

LATEST GLEASON EQUIPMENT



Greaves MACHINE TOOL CO.

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Wrigraph PRECISION DRAFTING MACHINE

Model J illustrated, with 10"x12" presdwood board, bronze bearings, calibrated parallel device, graduated drawing attachment. For desk use-letter size drawings. Price complete \$5.50.

L. G. WRIGHT, INC.
P.O. BOX 63A
Cleveland 21, Ohio

SHEFFIELD MULTICHEK COMBINES DIMENSIONAL INSPECTIONS

Inspections of numerous critical dimensions of automotive pistons as well as eight classifications are combined into



one fast operation on the "Airlectric Multichek" developed by the Sheffield Corp.

The operator merely loads and unloads the parts. Accuracy of check is entirely independent of the human element. Segregation into classifications is made possible by color stamping during the gaging cycle. The rate of inspection and selection is between 500 and 700 pistons per hour, according to the efficiency of the operator.

Pistons with undersize pin holes will not enter gaging position, and so are rejected at the start of the gaging operation. When the piston is in gaging position, simultaneous check is made of aver-

age diameter of pin holes at each of two bearings, diameters of four ring grooves, widths of five ring grooves and diameter of bottom skirt.

In addition, three classifications of pistons are automatically made on the basis of the average diameter of the pin hole, selections being made in steps of .0001" between minimum and maximum tolerance limits. Check and classification of the pin holes is made by an air spindle and "Airlectric" head, which also actuates a series of three color stamping devices. Further classification is made by five different selections in .0001" steps on the bottom skirt diameter by an "Airsnap" and "Airlectric" head, which also operates a series of five color stamping devices.

"Electrichek" heads are used for checking the diameter of the four ring grooves. Ring groove widths are checked with Go and No Go gaging members, which actuate microswitches. Each dimension has its own set of red and green signal lights to show respectively undersize and oversize. All individual dimension circuits are integrated into one master light circuit. The Sheffield Corp., Dayton 1, Ohio.

MERCOID CONTROLS

Designed to automatically regulate electrically operated equipment in accordance with changes in temperature, pressure, vacuum, fluid level or mechanical movement

CATALOG SENT UPON REQUEST

MERCURY SWITCHES by MERCOID

THE MOST IMPROVED TYPE IN MERCURY CONTACT SWITCH CONSTRUCTION. • MERCOID SWITCHES ARE NOT SUBJECT TO OPEN ARCING, NOR CAN CONTACTS PIT OR STICK. THEY ARE NOT AFFECTED BY DUST, DIRT OR CORROSION.

Write for Bulletin No. 300



THE MERCOID CORPORATION
4201 BELMONT AVE., CHICAGO, ILL. - U.S.A.

NEW CUTTING TOOLS

FREE BARGAIN BULLETIN

issued monthly listing war surplus H.S. drills, taps, dies, end mills, milling cutters, reamers and many other good buys.

For screw machiner we have in stock H. S. left hand drills, Reed Kauris, box tools, floating holders, etc.

MACHINE SHOP SUPPLIES
SID TOOL CO.

183 Grand Street, New York 13, N. Y.



A workman with the skill to do hand work always wants to make a good showing. Help him make better time when using a hack saw. Furnish him with blades especially designed to bite into "high speed" alloy steels. Supply him with Capewell's *Technite* — the blades doing an outstanding job for the automobile people on their hard-to-cut steels.

● Capewell's *Technite* is just as outstanding in the power blade sizes. Ask your Distributor for complete information.

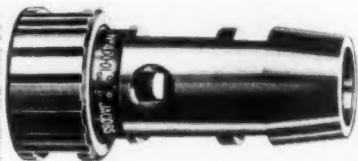
THE CAPEWELL MFG. CO.
HARTFORD 2, CONN.

METAL WORKING CRAFTSMEN FOR OVER 65 YEARS

NEW JACOBS CHUCK WITH WIDE CAPACITY RANGE

A new small diameter light weight Tap Chuck is in production by the Jacobs Manufacturing Co. Designed particularly for tapping heads and tapping machines, this chuck provides another application of the Jacobs Rubber-Flex Collet. The lightness and small diameter of the accessory combine to develop less torsional inertia, reduce tap breakage, especially in bottom tapping, and allow for quicker reversing and higher spindle speeds.

The unit is made up of several hardened steel jaws bonded into a synthetic rubber body which is resistant to deterioration from heat, coolants, or cutting compounds. All working surfaces of the collet are precision ground after molding, and the collet is centralized by a ground conical bore in the chuck body. As the chuck cap is screwed onto the body in the tightening process, the collet is forced into the cone until it has a rigid grip on the tap shank.



Mounted in the body, yet detachable, are two floating jaws of heat-treated alloy steel which provide a positive drive on the tap square. The jaws maintain a firm grip on the square, and do not influence the centralizing effect of the Rubber-Flex Collet. The jaws are connected by an operating screw and its socket head design allows the use of a standard hex key for adjusting purposes. Adjustment of these jaws is aided by a sight hole allowing the operator full view of the tap square when tightening.

Tap changing is effected by a quarter turn of the cap and of the screw connecting the positive driving jaws, which disengages the tap from the chuck. A new tool is inserted, both the cap and the jaw screw are tightened, all in a few minutes.

Bulletin 47-T describing the Rubber-Flex Tap Chuck may be obtained from the Jacobs Manufacturing Co., 100 Jacobs Road, Hartford 2, Conn.

AUTOMATIC STEEL DISINTEGRATOR

A completely automatic disintegrator which removes broken taps, drills, studs and reamers without distortion or heating has been announced by the Ansaldi Tool and Engineering Co., Detroit, Mich. Ansaldi automatic units are "self-feeding." Once adjusted in position, they operate by themselves. One man can control four or five machines. Electrodes disintegrate obstructions from die sections, castings, hardened steel, brass, bronze or alloys without damage to the casting of the machined part. Broken No. 2 taps up to 1" in diameter are easily disintegrated; an ordinary $\frac{1}{2}$ " tap is removed in 7 or 8 minutes. Electrodes are available in lengths of several feet for deep holes.

The disintegrator is of the revolving head type which swivels to any angle or compound angle. The machine can be used horizontally, upside down, to a height of seven feet or close to the flots. The extended arm has a radius of four feet.

The unit is supplied with casters for easy maneuverability, or if desired, can

be obtained in a portable model for use on the bench. No drill press is required. Standard tables are equipped with $\frac{3}{8}$ " screw holes for positioning of holding devices or work pieces.



ALL ALLOY PORTABLE SHEARS

FULLY GUARANTEED



Two Sizes

No. 1 cuts up to No. 11 gauge strip or sheet.

No. 2 cuts up to $\frac{1}{4}$ " steel plate.

BREMIL MFG. CO.

1720 Pittsburgh Ave. Erie, Pa.

The unit has an automatic feed and automatic control for 24 hour operation without heating. Control panel is equipped with voltmeter, control knobs and water controls. For further information write Ansaldi Tool and Engineering Co., Dept. BB, 4744 Twelfth St., Detroit 8, Michigan.

★ EVCO REVOLVING TIP LATHE CENTER ★

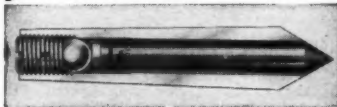
Lowest Priced
"Live" Center
On The Market

- Runs cool and yields under load to compensate for work expansion
- Same dimensions as standard solid centers
- No more messy lubrication of work centers

- No more damaged center holes in work
- Accurate quality construction throughout
- Saves time—saves money—saves work

\$6.25

No. 2 Morse Taper Shank
No. 3—\$7.75
No. 4—\$9.75
Morse Taper



ERNEST H. VANDERWALL CO.

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THE right blade pays for itself over and over again. And Victor makes a blade that's right for every job a hack saw or band saw can do!

See your Victor supplier. Follow his advice and you're absolutely sure to get the blade that will serve you longer, whether you're cutting metals, plastics or other non-metallics. This blade will cut faster, cleaner—cut cutting costs by staying on the job a longer time. Victor's special steel hardening sees to that.



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VICTOR

Victor Saw Works, Inc., Middletown, N. Y.
Makers of Hand and Power Hack Saw Blades,
Frames and Metal Cutting Band Saw Blades

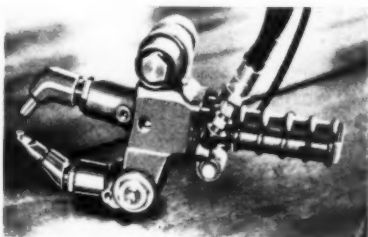


HYDRAULIC WELDING GUN PRODUCES 3000 SPOTS PER HOUR

A hydraulically operated Welding Gun and Booster, designated as the "Dalhart," is introduced by the Dalhart Engineering & Manufacturing Co. It completes strong uniform welds, since the point pressure, hydraulically actuated, is uniform, regardless of the wear on the points. This pressure eliminates the destructive burning and pitting at the weld point by reducing arcing to a minimum, with no flash nor sparks. Transformer heat is utilized to the fullest extent at the welding point, and not dissipated in fireworks.

The life of the welding points has been greatly increased, due to elimination of burning and sticking of points to metal; the minimum life of points now being used on auto body production, at 3000 spots per hour, is a total of 108,800 spots from one point.

The mechanical speed of the Dalhart Gun is limited only by the maximum speed with which a solenoid air valve can be operated. The welding point pressure can be varied by controlling the air pressure on the booster inlet. The hydraulic piston diameter of the booster can be varied to suit the displacement of the gun stroke required.



The Dalhart Gun, according to its makers, is highly adaptable; it may be attached to a bench or pedestal to make a stationary unit with foot controls. If necessary, a long-stroke cylinder may be attached to a deep throat yoke, for the welding of long or irregularly shaped articles.

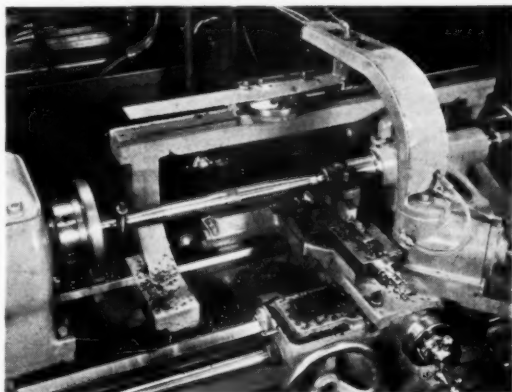
Additional information and specifications will be furnished by the Dalhart Engineering & Manufacturing Co., 14827 E. Jefferson St., Dept. BB, Detroit 15, Mich.

AIR-TRACER STEPS UP MACHINING TIME ON MONARCH LATHES

Special purpose machine tools, or machines equipped with multiple cutting tools, have long since solved the problem of attaining high production machining of parts where these were needed in large enough quantities to offset extensive set-up time and tooling expense involved. Until recently, the only economic way to handle short runs of parts was on general purpose machines such as engine lathes.

Now, high production of even small numbers of parts should be achieved with the "Air-Tracer", a device developed by the Monarch Machine Tool Co., for application on their regular Tool-maker and Engine lathes. Hydraulically operated, the mechanism guides the motion of the standard lathe cutting tool in strict conformity with a master template of the finished piece.

Typical of the new device's efficiency, is the reduction in machining time achieved on winch shafts for oil well equipment. This job calls for ten different diameters and two tapers on a 23" long stress proof steel shaft. Without the new lathe attachment, the operation took 45



min. per shaft. With the new device, the same 16" Model C Monarch engine lathe, using the same tooling and operating on the same material, finished the work in three minutes. Set-up time which, with the use of multiple cutting tools in an automatic or semi-automatic type of lathe would have amounted to 2½ to 4 hours, (to be repeated every time the tools required removal for sharpening) was less than ten minutes with Monarch's new "Air-Tracer" equipment.

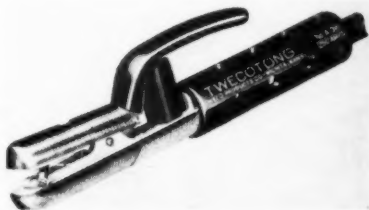
INSULATED ELECTRODE HOLDER HAS CAPACITY RANGE OF 1/16" THROUGH 3/16"

A new model has been added to the line of Insulated Tong Type Electrode Holders produced by the Tweco Products Co.,. Designated as the Model A-316, it is a smaller, but similar companion to the A-14 and A-38 Holders. This accessory fills the requirements of the average job shop or maintenance welder using 200 ampere welding equipment.

The A-316 Electrode Holder is light in weight, compact, and easy to operate. It has a 95 pound bite on a 3/16" electrode. The tip and body insulation is of molded, laminated glass cloth Bakelite, using the "Tubular-Keyed" Tweco design. The insulated spring is Neoprene covered. The

cable connection is a simple clamp, plus a socket for soldering when desired.

Specifications include a capacity of

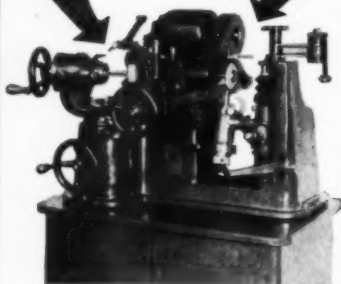


1/16" through 3/16" electrodes; 250 amperes; weight is 18 oz., length 9". The Tweco Products Co., P. O. Box 666, Wichita, 1. Kansas.

THE New MODEL 1100 HYBCO TAP GRINDER

ACCURATELY GRINDS
CHAMFERS of TAPS,
CORE DRILLS

SHARPENS FLUTES,
SPIRAL POINTS
of TAPS



- Capacities No. 2 Mach. Screw to 1½" Hand Taps.
- All Settings Adjustable To Give Any Angle—Relief—Hook.
- Taps Held In Precision Collets Can Be Sharpened After Center Is Destroyed.
- Standard Motor—Any Current Specification.

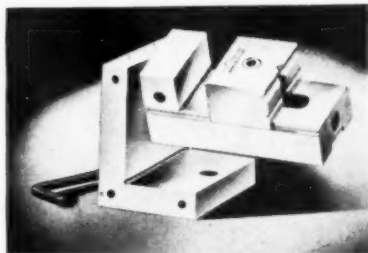
Representatives In Principal Cities

HENRY P. BOGGIS & CO.

1279 West 3rd Street
Cleveland 13, Ohio

COMBINATION VISE AND ANGLE PLATE FOR PRECISION WORK

Gale Forssen Co., distributors of time-saving tools, announce a new Combination Vise and Angle Plate for use in precision layout, jig boring, drilling and tapping, light milling, and industrial inspection. The Vise, measuring 4-5/16" long x 2" wide x 2" high, is provided with a 1" jaw depth, allowing a 1¾" jaw opening. The accompanying Angle Plate has dimensions of 2½" high x 3½" long x 3½" wide.



These accessories are hardened and ground square to within .0003" on all dimensions (including Vees). The vise mounts at any angle desired on its end or on either side. All the adjusting screws are actuated with a 5/16" Allen cap screw wrench. The uses of these tools are limitless, depending only upon the ingenuity of the user. The Gale Forssen Co., 64 Monmouth St., Dept. BB, Springfield 9, Mass.

DETROIT NIB-TYPE TAPS ACCELERATE TAPPING OPERATIONS

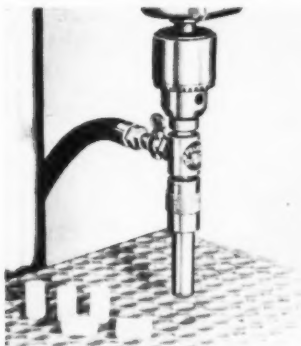
Developed by Detroit Tap and Tool Co., nib type "M-11" taps coupled to hollow shanks have been found useful in tapping pipe couplings, and tapping through several parts at a time.

The nib taps have a 30% lighter hollow shank, produced from steel tubing, with an internally broached spline. There is a knurled portion on the OD of the shank to assist the operator in removing the tap from the chuck.

The nib tap itself is made of exclusive M-11 cobalt-chrome high speed steel, with a stub shank, splined to fit the hollow shank. The Detroit Tap and Tool Co., 8432 Butler St., Detroit 11, Mich.

FELKER DIAMOND ABRASIVE CORE DRILL

Designed to drill holes in all hard, brittle, non-metallic materials, is the new Felker Di-Met Core Drill. Exceptional



drilling speed is due to the novel method of supplying coolant through the drill stem to the metal-bonded diamond abrasive rim. Due to coolant pressure, chips

and sludge are flushed from the hole as fast as developed, and since the coolant supply is constant, the drill functions without heat, regardless of hole depth. The Core Drill may be used in drill presses, on portable electric drills or directly coupled to motor shafts.

Applications are numerous in drilling or coring glass, tile, concrete, ceramics, and similar substances. Once seated, the drill travels in a straight line and the depth of the holes is limited only by drill length. With care, unbroken cores of any length are easily produced within the drill capacity.

When drilling exceptionally hard materials, such as petrified wood, special coolants such as soluble oil, may be preferable. The supply is connected to the coolant head through a flexible rubber hose and this head remains stationary during drilling operations.

Only three drill heads are required for all drill sizes from $\frac{1}{8}$ " to $2\frac{1}{2}$ " inclusive, by sixteenths. Standard drill lengths are $2\frac{5}{8}$ ", but drills of any length can be supplied. Circulars are available by writing to the Felker Manufacturing Co., Torrance, Calif.

SPECIFY

Hall...

PRECISION LEVELS

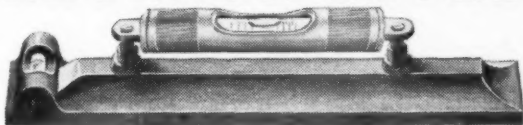


FIG. NO. 5 Adjustable type Machinists' Levels with ground and graduated vial. Grooved for use on shafting. Sizes 4", 6", 8", 12", 18".

"MANUFACTURERS OF
SPECIAL LEVELS
FOR ANY USE."

FIG. NO. 50—For setup and maintenance is accurate to 10 seconds. Graduations are in .0005" per foot. Packed in Instrument Case.

Address Orders or Inquiries to

HALL LEVEL AND MANUFACTURING WORKS

(Established in Geneva, Ohio, in 1913)

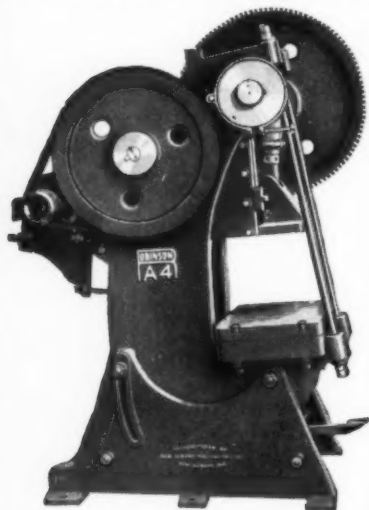
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281

Long Recognized for durability strength and service



● The new improved Series A Robinson Punch Presses retain all the sturdy characteristics of their predecessors with added safety, speed, strength and ease of operation and maintenance. Available in five sizes.

Send for descriptive Bulletin No. 7.

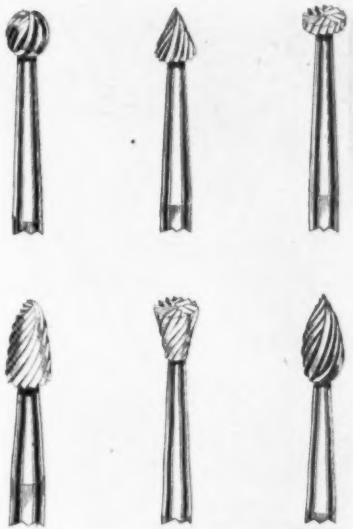
New Albany Machine Mfg. Co.
New Albany, Indiana, U.S.A.



HIGH SPEED 3/32" SHANK LAB MILLS NOW STANDARD

Severance Tool Industries Inc., offer High Speed 3/32" Shank Lab Mills in 10 shapes and 6 sizes for use in the manufacture of Diesel injectors, aircraft parts, die castings, dies and molds, and other small intricate parts. This is the first time that high speed mills, ground from solid stock, after hardening and mounting on shanks of this size, have been available to industry as standard items.

Severance High Speed 3/32" Shank Lab Mills are 1 1/2" in overall length, and are available with cutting head diameters from 1/16" to 5/16", in 1/32" steps. Intermediate fractional sizes are available on special order.



Severance High Speed 3/32" Shank Lab Mills are made of the same high grade steel used in Severance Standard Midget Mills. They may be reground several times, insuring productive use over a long period of time. For complete information write Severance Tool Industries Inc., 722 Iowa St., Saginaw, Mich.

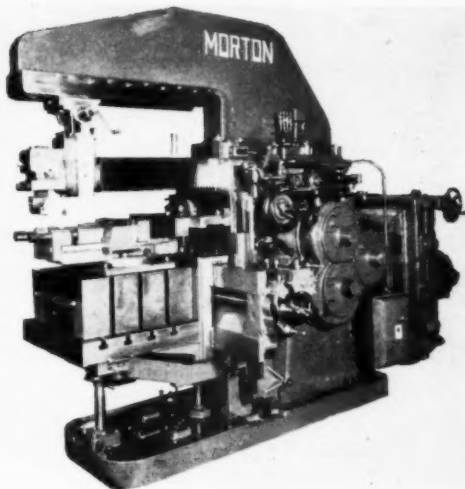
MORTON 32" STROKE HIGH DUTY DRAW CUT SHAPER

This Morton 32" stroke High Duty Draw Cut Shaper, with Overhead Ram Support and Special Heavy Duty Shaper Head, is built for either light or heavy duty shaping and planing. It has 32" of cutting stroke, 32" of horizontal or side feed, 16" of vertical feed and a distance from the ram to the table when lowered of 30". A rectangular hollow bored forged steel ram 6" x 7" provides ample strength for deep cuts with coarse feeds.

Two elevating screws provide continuous alignment of the table and work. Rapid Power Traverse and Automatic Feeds for both horizontal and vertical movement are provided. A Morton Draw-Cut eliminates the loosening and tightening of outer support bolts to the table each time it is moved vertically.

Special gibbing is provided to the Overhead Ram Support and Special Shaper Head allowing for quick adjustment. Automatic Oiling is provided for all major moving parts. It is powered with either a d-c 7½ hp or a-c 7½ hp Multi-Speed Motor or 10 hp Constant Speed Motor and Control with Variable Speed Transmission.

Deep cuts and coarse feeds, shaping to layout lines on the outside of the work in clear view of the operator, the use of forming tools and special setups and the



chip removal towards the machine column instead of towards the operator as with other Shapers are all features of Morton Draw-Cut Shapers.

This machine is highly efficient for industrial production and is used in many shops as a companion tool to larger Morton High Duty Draw Cut Shapers. Additional information will be furnished by the manufacturer, The Morton Manufacturing Co., Broadway & Hoyt Streets, Dept. BB, Muskegon Heights, Mich.

'STAR DUST' LABORATORY GRADED PURE DIAMOND POWDERS

For GAUGES, TOOLS, DIES, etc., with tremendous TIME SAVING. These factors make STAR DUST indispensable in lapping and superfinishing on HARDSTEELS, TUNGSTEN CARBIDE, CHROME.

- Absolute control of particle sizes
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There is a STAR DUST Field Serviceman in your territory.

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NEW YORK 7, N. Y.

STAR DUST speeds up production enormously and produces finishes and superfinishes down to less than .0000004 of an inch.

**Precision LAPPING
POWDERS for
PRECISION work**





In manufacture of special tools for maximum production the skill of the tool craftsman is the most essential element.

Andersons, Inc., specializing in precision tools and fixtures are so manned and equipped as to assure the best in tool design and craftsmanship.

Your inquiries for special tooling are solicited and will receive prompt efficient service. Let us help you solve your tooling problems.

GAGES, FIXTURES, SPECIAL TOOLS

FORM TOOLS—DOVETAIL AND CIRCULAR
MILLING CUTTERS—END MILLS—REAMERS

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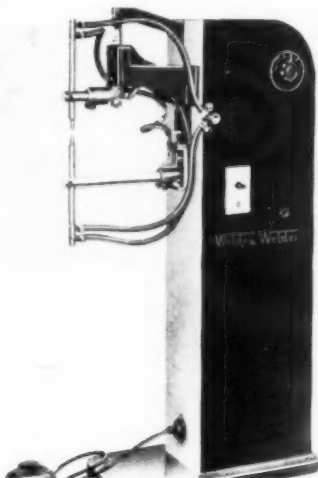
Andersons, Inc.



2333 NELSON ST., CHICAGO 18, ILL.

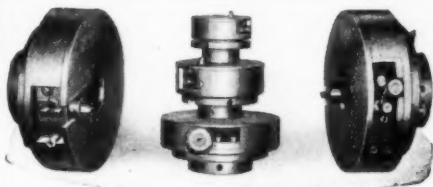
WELDEX HIGH-SPEED PNEUMATIC SPOTWELDERS

Weldex Inc. announces a new high speed, fully automatic, air-operated, electronically timed spotwelder series, in two models: No. 752-P, press action type, and No. 752-R, rocker arm type. Rated at 7½ KVA, both models are designed with a high power-space ratio for continuous production welding on thin metals up to two thicknesses of 14 ga. cold rolled steel, or equivalent.



The welders have a built-in transformer, tap changing switch, solenoid air valve, single-acting air cylinder, adjustable pilot switch, magnetic contactor, and electronic timer, which automatically controls all phases of the welding cycle, and assure strong high quality welds. Advanced transformer design includes unique winding and insulation, assuring long life.

Standard equipment includes adjustable air pressure regulator, brass air strainer, pressure gage, movable push button foot-switch, water-cooled electrode holders, and water-cooled welding tips. A new 10-page catalog is available from Weldex Inc., Dept. K, 7325 McDonald Ave., Detroit 10, Mich.



MUMMERT-DIXON FACING HEADS with Automatic Feed

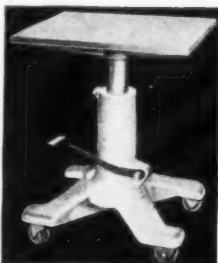
One-way Tool Feed — 6, 9 and 12" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.



SAVE Labor and Time

Eliminate heavy lifting. Cut handling costs. Table

swivels and locks in any position. Can be varied $15\frac{1}{2}''$ by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

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- TOOL AND DIE WORK



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478 Lexington Ave., New York 17, N. Y.

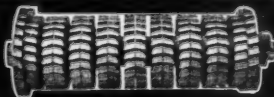
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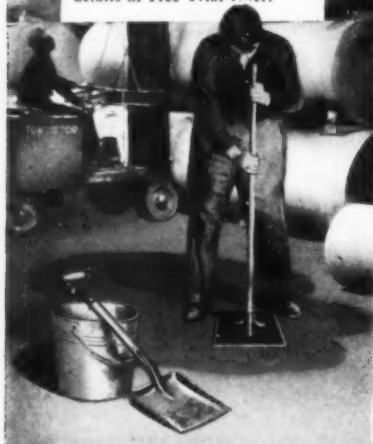
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Simply Tamp Smooth... Truck Over

There's no wait for setting with Flexrock's new plastic floor repair material. Simply shovel INSTANT-USE into the hole or rut — tamp — and your floor is restored to solid smoothness... ready for traffic instantly. Tough INSTANT-USE bonds tight to old concrete — makes long-lasting, heavy-duty patch. Withstands extreme loads. Keep a drum on hand for emergencies. Immediate shipment. Mail Coupon for descriptive folder and details of Free Trial Offer.



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FREE TRIAL OFFER

FLEXROCK CO.,

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Canadian Office: 21 King St., E., Toronto

Please send me complete INSTANT-USE information... details of TRIAL ORDER PLAN—no obligation.

Name

Address

Company

WESTON ELECTRONIC ANALYZER

A compact Electronic Analyzer, providing facilities for accurate voltage, current and resistance measurements covering frequency ranges of most electronic applications, is announced by the Weston Electrical Instrument Corp.

This unit embodies within one instrument a high frequency vacuum tube volt meter, an electronic volt ohmmeter, and a complete 10,000-ohm-per-volt d-c and 1000-ohm-per-volt a-c multimeter. Use of a new type, unity gain d-c amplifier, incorporating both regeneration and degeneration, achieves great stability of the electronic circuits in the vacuum tube volt meter and the electronic volt ohmmeter. The Analyzer is completely line isolated and line insulated to reduce external radio frequency influence.

The vacuum tube volt meter is completely stable over wide variations in line voltage and covers a frequency range of 50 cycles to 300 megacycles without accessories or adaptors, at ranges of 3/12/30/120 volts. Accuracy is 5% to 150 megacycles, and 12% from 150 to 300 megacycles, direct reading. The 3 1/2" and

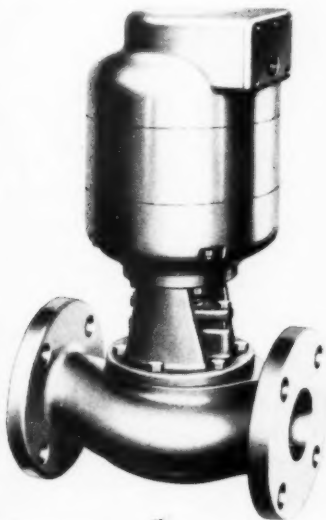


3/4" diameter R.F. probe is equipped with a flexible cable for plugging into the front panel.

Additional information is available from the Weston Electrical Instrument Corp., 619 Frelinghuysen Ave., Dept. BB, Newark 11, N. J.

RUTHMAN DEVELOPS CIRCULATING PUMP

The Ruthman Machinery Co., manufacturers of Gdsher Coolant Pumps, announce the production of the new "Rumaco" Circulating Pump, designated as Model 1-B.



The driving motor, direct connected to the pump, is a totally enclosed type, equipped with grease packed, sealed precision ball bearings. Since no added lubrication is necessary, all oilers and grease fittings have been eliminated. The motor stator is dynamically balanced by the dynetric process to extremely close limits, insuring vibrationless operation.

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TOPFLIGHT TOOL CO. INC.
YORK, PENNSYLVANIA

The pump, built on centrifugal principles, is provided with opposing inlet and outlet for standard (125 lb.) 2" pipe flanges. The unit can be easily installed in a pipe line of various sizes by the use of pipe reducers, and can be operated in any intermediate angle from a vertical to a horizontal position. Further information on the Rumaco pump is available from the manufacturer, The Ruthman Machinery Co., Cincinnati 2, Ohio.

ZINC-BASE LOW TEMPERATURE WELDING ROD

All-State Welding Alloys Co., Inc., 96 West Post Road, White Plains, N. Y., announces that a low-temperature welding rod for use on zinc-base die castings is now available in 3/32" diameter, round form. This small-sized diameter has been found useful for most applications and is easy to apply. The rod has a working temperature of only 400° F; it has a high shear strength of 25,000 lb. psi, and it gives a perfect color match. It can be used with or without a flux.

This rod, known as All-State No. 53 zinc-base die cast rod, is excellent for repairing radiator grilles, hinges, and all types of castings made from zinc-base die cast.

DEEP-HOLE DRILLING

Are deep holes a problem in your shop?

Let us do these troublesome jobs for you on our special gun drilling machines. Smooth straight holes from 3/16" to 1 1/2" in diameter—drilled to any depth.

Send us your part prints for estimate.

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Detroit 3, Michigan

Drilling - Boring - Reaming CUT LOADING TIME with ESCO Drill Jigs

Standards — Mijits
50 sizes always in stock

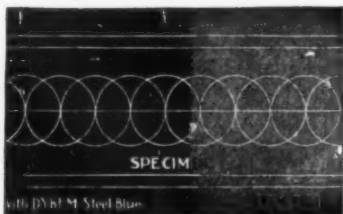
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DYKEM STEEL BLUE STOPS LOSSES making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

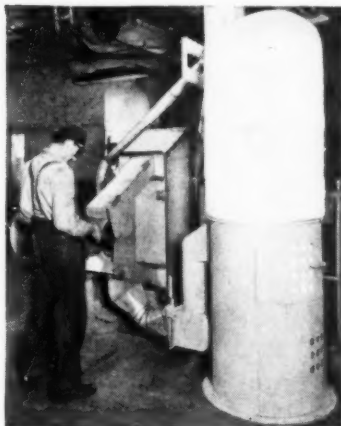
2301G North 11th St., St. Louis, Mo.
In Canada: 2466 Dundas St. West, Toronto, Ont.

PORTABLE SELF-CONTAINED DUST CONTROL UNIT

The Kirk and Blum Manufacturing Co. has produced a new Self-Contained Dust Control Unit, which meets the needs of both large and small plants where layouts require the placing of one or more machines in buildings not served by the central dust control system, or in isolated parts of the main plant building.

This unit can be set up to serve any machine for as brief or as long a period of time as needed. It will handle sawdust and shavings from woodworking machines, grinding, buffing and polishing particles from metal working machines.

Features include an air volume of 900 CFM, at 2" suction, capacity for four 3", two 4", or one 6" pipe connections, and a 4 cu. ft. storage compartment. The unit is semi-automatic in its cleaning operation. The development of the Dust Control Unit has resulted, the makers claim, in a highly satisfactory method of handling the dust problem in plants



having isolated departments or machines where the central station type system is not applicable nor practical.

Further information and quotations are available from the Kirk and Blum Manufacturing Co., 2905 Spring Grove Ave., Cincinnati 25, Ohio.

SMALL END MILLS FOR TOUGH JOBS MICRO MINIATURES

High Speed—Fast Feed

A new precision method of manufacture gives MICRO MINIATURES outstanding QUALITY and unusual STRENGTH for production use. MICRO MINIATURES will help you. They have eliminated milling problems for others.



Call your dealer
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SPECIAL SIZES to fit your job

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- " 2-3-4 Flute
- " 2-3-4 Flute
- " 2-3-4 Flute

BALL ENDS

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- " 2 - 3 Flute
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SINGLE OR DOUBLE END

All sizes $\frac{1}{8}$ " Shank

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★ THE ★ WONDER CUTTER

The lowest-priced wire and rod cutter on the market. The hardened cutters last indefinitely.

Hand operated. A giant for work, cuts wire and rods up to $\frac{3}{8}$ -in. round or $\frac{3}{8}$ -in. square and band iron up to $\frac{1}{2}$ in. by 2-in. Adjustable stop for repeated cuts to same length. Large or small, your shop can use a WONDER CUTTER.

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*Bench
Surfacer*
No. 60L

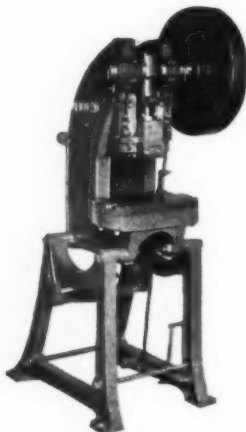
Here is a compact,
durable, smooth
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or and Polisher—direct motor driven—complete and ready for use. An ideal machine for—cleaning and finishing castings — removing burrs — straightening and finishing dies, stampings, etc. Excellent performance — Adjustment made by hand, no tools needed — Write today for full details.



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MACO Punch Presses



No. 16—5 Ton

No. 18—Fabricated—8 Ton

No. 20—12 Ton

Specifications for No. 20

- ✓ Extra heavy construction
- ✓ Crankshaft, main bearing, 1-15/16"
- ✓ Crankshaft bearing, 2-1/16"
- ✓ Inclined
- ✓ Elevating screw

Machines built for the trade; on their exclusive merits, performance and durability, by

MICHAEL AMENDOLA & CO.
1059 Washington Avenue
Bronx 56, N. Y.

ROOT UNIVERSAL JOINT REINFORCED FOR WEAR

The B. M. Root Co., Manufacturers of special machinery, announce the development of the Root Universal Joint on a large scale production basis. Its construction features several points of design of interest to designers and manufacturers in fields where these accessories have application.

The joint works with a "ball-and-socket" action similar to a toggle joint. The stress of transmitting power through the angular range of joint deflection is absorbed by two oversize keys. This provides a margin of strength at the point where failure of universal joints is most likely to occur. The socket of the joint provides a natural oil reservoir for retaining oil and the consequent lubrication of bearing surfaces by capillary action. All parts are machined to close tolerances and wearing surfaces are hardened.



The tool has a relatively small outside diameter in relation to the size of the shaft it will turn. This makes the joint useful where restricted space is available for placement of the joint. It is available for shafts from 1/4" to 7/8" diameter. Larger sizes can be furnished on application.

Bulletin No. 163 carries complete specifications on the joint and is available by writing to the B. M. Root Co., Dept. B3, York, Pa.

Level in a Jiffy!

4 sizes: 2 3/4", 3 3/4", 5 1/4" and 7 1/2" closed heights. Self-leveling ball and socket cap.



Simplex Mechanists' Jacks cut costs by speeding leveling of work on planers, milling machines, etc. Side lock holds screw at desired height. No. 3A Spreader Jack is invaluable for work in close quarters. Ask your dealer.

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Better, Safer Jacks Since 1899

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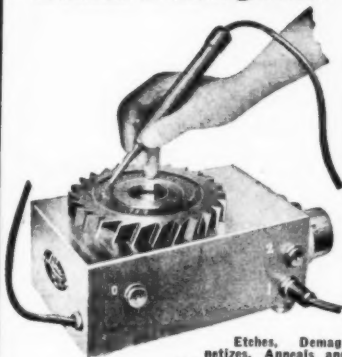


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for
RODS FLAT BARS ANGLES
WIRE ROPE

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L U M A Combination Etchtool & Demagnetizer



Etches, Demagnetizes, Anneals and Solders. Will permanently mark hardest steel with ease of a fountain pen. Etch and Demagnetize in same operation or separately. Write for details.

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LITTELL



**SAFER
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LITTELL Air-Blast Valve automatically ejects pieces from punch presses. Keeps operator's hand out of danger zone. Increases safety and speed. Air nozzle quickly adjustable.

Other Littell safety devices include Pres-Vac Safety Feeders for picking up and feeding flat-surfaced materials; also, air-operated Mechanical Pickers for feeding pieces that vacuum lift will not pick up.

Littell makes a complete line of Automatic Reels, Feeds, Straighteners, Scrap Cutters, etc. **REQUEST BULLETINS**

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STEEL APRON BRAKE

NOW AVAILABLE IN
6 AND 8 FT. 14 GA.
10 FT. 16 GA. CAP



EASE AND SIMPLICITY
HAND OPERATED
ENGINEERED AND BRACED
TO DO THE JOB RIGHT
FULLY GUARANTEED
QUICK DELIVERIES

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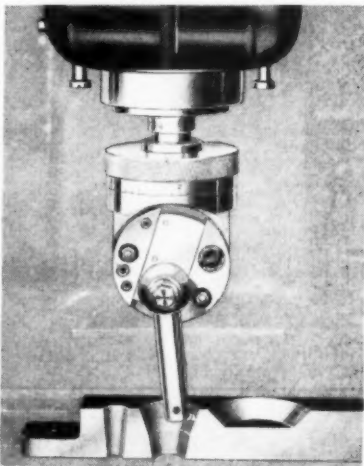
WM. C. JOHNSON &
SONS MACHY. CO.

1211 Hadley St. St. Louis 6, Mo.

TAPER-BORING TOOL HAS MULTIPLE USES IN ONE SET-UP

A boring tool which fits all milling machines, jig borers, and boring bars is in production by the Tree Tool and Die Works. This accessory, known simply as the Tree Taper-Boring Tool, is a compact unit only 4" in diameter and 5" long, made of heat treated, precision ground alloy steel, for long life, strength and accuracy. Its simplicity of operation and adaptability make it useful for boring metal patterns, die cast dies, rubber or plastic molds, drop forge dies, and the like. The unit is capable of boring tool steels, cast iron, and non-ferrous metals.

In one set-up, straight boring, facing, and outside turning, either straight or taper, can be performed, in addition to taper boring. The work need not be moved, since all adjustments are made on the tool, rapidly and simply.



Set-up time can be cut down from hours to a few minutes, since the Taper-Boring Tool eliminates the need for special taper tools and elaborate set-ups. The tool bores holes to any taper up to 10" in diameter, by setting the graduated swivel base to the desired angle, swinging the boring bar into cutting position, and holding the knurled ring stationary as the tool revolves.

The Taper-Boring Tool is a product of the Tree Tool and Die Works, Racine, Wis.

**DOALL BENCH FILING MACHINE FEATURES
UNIVERSAL JOINT CLAMP**

The DoAll Co. announces a new and larger Model FH-10 Precision Bench Filing Machine for filing, sawing, and honing operations. This machine incorporates the patented universal joint clamp which assures a 100% vertical file position despite warped or twisted file shanks. A file setting square is supplied for aligning the file, hone, or saw before the universal joint is tightened.

An overarm backup roller supports the tool. The tilting table is 10 $\frac{1}{2}$ " square. The machine has a 1 $\frac{1}{2}$ " stroke and a file shank capacity of $\frac{1}{8}$ " to $\frac{3}{8}$ ". Tools are actuated by a scotch yoke mechanism running in an oil bath. A window in the housing indicates the correct oil level. Vertical shaft bearings are adjusted by locking thumb screws on the outside of the housing. A



neoprene bellows keeps chips out of the mechanism, and provides an intermittent air jet through a flexible tube to remove chips at the point of work.

The unit is powered by a $\frac{1}{4}$ hp 110 volt, 1724 rpm., a-c motor which provides approximately 350 strokes per minute.

This accessory is completely described in folder No. D137 obtainable upon request to the DoAll Co., Minneapolis, Minn.

ARGUTO
OILLESS BEARINGS

USED

ALL OVER THE WORLD

**... IN MANY DIFFERENT
APPLICATIONS**

**"OUTWEARS THE BEST
BRONZE METAL"**



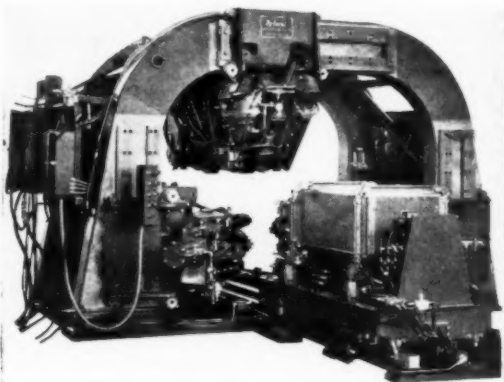
ARGUTO OILLESS BEARING CO.
WAYNE JUNCTION PHILADELPHIA

FEDERAL HIGH-PRODUCTION MASH SEAM WELDER

The Federal Triple Duplex Traveling Head Series Seam Welder has been developed by the Federal Machine and Welder Co. The machine is provided with three 300 KVA water-cooled welding transformers wound for 440-volt, 60-cycle, single-phase a-c power supply, complete with individual 16-step heat regulators. One transformer is mounted in each of the three dual welding heads. The welding wheel spindles are internally water cooled.

The main frame, composed of fabricated steel sections with all weldments fully stress-relieved, has special provisions for the traveling fixture carriage and the duplex seam welding heads. The equipment has its own hydraulic system complete with hydraulic pumping unit and oil cooling reservoir for supplying fluid under pressure to the welding head traveling cylinders and fixture carriage actuating cylinder. Each of the six welding heads is provided with an air cylinder for applying weld pressure.

The welding heads are angularly mounted to accommodate the 45° angle of the welding of the liners. Heads are manually adjustable, vertically and laterally, to accommodate the welding of the various size liners. Changes in weld travel length of the welding heads are accom-



lished by changing the limit switch settings.

The complete welding cycle takes 25½", allowing a production of approximately 90 units per hour, using one operator and one helper for loading and unloading. By the addition of a shuttle type fixture carriage and an enlarged pumping unit, production can be raised to 180 units per hour, with one operator and three helpers. The mash seam weld is of such a quality and appearance that it requires no finishing or dressing prior to the application of porcelain enameling. The unit is manufactured by the Federal Machine and Welder Co., Warren, Ohio.

TURCO CLEANING TANK CLEANS BY PRESSURE

Faster removal of oil, grease, chips and other foreign matter that collect on parts during machining, drilling, and similar production operations is claimed for the Turco Turbulator Tank, an automatic, multi-flow, cold tank cleaner now being produced by Turco Products, Inc.

The Turco Turbulator utilizes a new principle of liquid flow action. Actuated by air volume, pressure differential and gravity, it cleans parts with a combined liquid scrubbing and solvent action. Tiny metered orifices release compressed air which induces a flow of liquid in the inner tank. The cleaning compound is

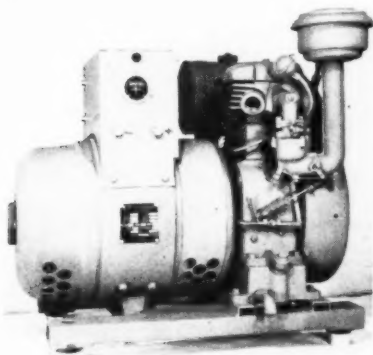
forced under pressure through and around the parts, cutting the thin film from the surface and depositing particles in a static sludge compartment. Only clean compound returns to work on the next film until the fluid action has scrubbed its way to the bare metal.

There are four models of the tank; the working space ranges from 1'6" x 1'6" x 1'4" to 6'6" x 3' x 2'10" with working capacity ranging from 52 gallons to 765 gallons. They are sturdily constructed with no moving parts to wear out or replace. Further information may be obtained by writing the manufacturer, Turco Products, Inc., 6135 So. Central Ave., Dept. BB, Los Angeles 1, Calif.

KATO AC AND DC PLANT

The Kato Engineering Co. announces a new Katolight plant model, with a 2500 watt a-c capacity. The unit is self-excited, and cranks from 24 volts of battery. The d-c winding has sufficient capacity to charge a standard 32 volt glass jar type battery. This Katolight plant is complete with battery charging relays, and the charging rate is automatically self-adjusting. When the plant is carrying a fully a-c load, there is virtually no dc battery charging. Under a partial a-c load, the battery is charged at a proportionally greater rate.

The unit may be furnished either with full automatic, or remote control. A voltage regulator holds a-c voltage within 5 volts change between no load and full load.



The generator is mounted directly on the side of the engine, a Briggs & Stratton ZEP, 1 cylinder, 3" bore, 3 3/4" stroke, 1800 rpm, oil bath air cleaner, ignition filtered and shielded model. It is mounted on a welded steel base, equipped with rubber vibration absorbers. The motor is available with gravity feed gasoline tank or fuel pump to permit drawing fuel from a supply tank. The gasoline consumption under full load is 2 1/4 hr. per gallon, and under partial load, approximately 3 1/4 hr. per gallon.

Further information on this electric plant will be supplied by the Kato Engineering Co., Mankato, Minn.

FOR ASSEMBLY, BENDING ★ AND BROACHING ★

1883 - GREENERD - 1947

THE ORIGINATORS OF THE ARBOR PRESS IN 1883



Precision

Work in Manufacturing

An Arbor Press for every need, ranging from 1/4 to 30 tons capacity, both hydraulic and mechanical types. Write for Catalog G.

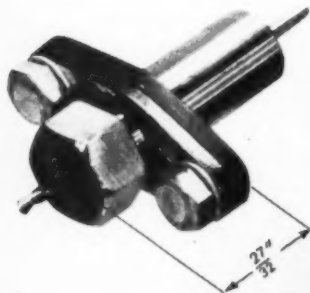
GREENERD ARBOR PRESSES

NASHUA, NEW HAMPSHIRE, U.S.A.

EST. 1883

REDESIGNED ERICKSON HOLDER FOR BROWN & SHARPE LATHES

The Erickson Adjustable Floating Holder for Brown & Sharpe No. 00 Automatic Lathes has been redesigned for heavy duty use. Heavier flanges and adjusting screws allow for greater wear and endurance. The overhang has been reduced to $27/32$ " for increased rigidity, accuracy, and maximum clearance.



The same collet is used as before, each size with an over-all collapsibility of $1/32$ ". The holder grips solidly and uniformly along the entire length of the collet, allowing successful stubbing (gripping accurately on the flutes), and prolonging tool life. The range is from $1/4$ " down to a No. 80 (.013") drill. Further information is available from the Erickson Tool Division, 2309 Hamilton Ave., Cleveland 14, Ohio.

STANDARD OFFERS ALL-STEEL DIE SETS

Standard Machinery Co., Providence, R. I., manufacturer of power presses, now offers "Standard" all-steel die sets in a complete range of sizes. These can be supplied for all presses and eliminate the expense of setting up the dies every time a job is repeated. All parts are ground and bored to exceptionally close limits: die shoes, punch holders, pins and bushings are fully interchangeable from stock without re-work or fitting. Back pin Die Sets, stocked ready for shipment, are listed with specifications in Catalog Section DS available from the manufacturer on request. Special die sets built with the same precision are made to order.

NORTHERN GAP FRAME HYDRAULIC PRESS

A 20-ton Gap Frame Hydraulic Press is announced by the Northern Tool and Machine Co., designers and engineers. The unit is of all steel welded construction, and occupies only $18" \times 36"$ of floor space. The Gap Press has $8"$ of throat, a $12"$ stroke, and a platen $12" \times 17"$.

A stroke selector enables the operator to adjust the stroke length in a few seconds, by the tightening of a thumb screw. Salient features include a hard chrome finished ram, a tonnage control adjustable up to 20 tons, a pressure holding valve, and fast ram speed.

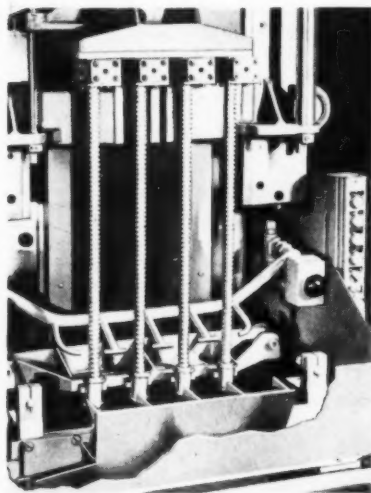
Northern presses are motor driven, have a pressure gauge at eye level, and are available with foot or hand control. Presses are adapted to all metal forming operations within their capacity, as well



as drawing, bending, straightening, forcing, riveting, etc. An illustrated folder describing the Northern line of hydraulic presses is available from the manufacturer, Northern Tool and Machine Co., 1120 North 31st Ave., Dept. BB, Melrose Park, Ill. ,

BROACHING FOUR BICYCLE COASTER BRAKE HUB SHELLS IN ONE PASS

Three splines, .290" wide x .123" deep x 2" long are broached in each of four S.A.E. 1112 steel bicycle coaster brake hub shells in one pass at the rate of 630



pieces per hour on this "XP-30 x 54" stroke vertical pull-down broaching machine, manufactured by the Oilgear Co., 1301 W. Bruce St., Milwaukee 4, Wis.

Operator merely roughly locates bicycle shells in the fixture on table and depresses the two start buttons. Descending tools automatically centralize shells. Tools are pulled downward thru the shells. Automatically, the shells are ejected into separate troughs equipped with guides to make them roll out quickly and lined with rubber to prevent parts from being marred. Chutes extending out the left side of machine are connected to customer's conveyor system so the parts are carried away automatically. Tools return to loading position automatically. All operator has to do is load four parts and depress the dual safety start buttons.

Inherent in the Oilgear pull-down principle of operation is positive continuous and pressure lubrication of tools and

coaster brake shells during the broaching operation. Chips fall quickly away from tool and cutting zone. Tools are secured at both ends during the major portion and cutting stroke. Possible sagging or bending of tools is eliminated by pull-down broaching in a vertical plane. Operator does not have to handle sharp tools.

VEELOS V-BELT

Veelos V-belt catalog describes features of adjustable V-belt, construction details, illustrates how to couple and uncouple, measure and install. It also includes engineering data and 13 pages of application photographs showing installations in a wide variety of industries. Advantages are described, together with applications and construction features . . . the catalog demonstrates how to measure and install . . . gives full engineering data . . . may be used as a reference book. Manheim Mfg. & Belting Co., Dept. BB, Manheim, Penna.

GROBET ROTARY FILES

An attractive 16-page illustrated booklet has been published illustrating and listing the different Grobet Rotary Files. These include ball, oval, cylindrical (flat end and ball nose) tree, cone, inverted cone and other shapes, each in a wide range of diameters and lengths of cut. Also found in this booklet are Grobet Diesinker Rotary Files, both hand cut and ground from the solid Burrs, Tube Deburring Reamers, Countersinks, etc. A copy of "Grobet Rotary Files" will be sent on request to The Grobet File Co. of America, Dept. BB, 421 Canal St., New York, N. Y.

SCIACKY 3-PHASE RESISTANCE WELDING

Two Sciacky bulletins described balanced 3-phase resistance welding, permissible with the use of electronics, new system which puts balanced load on all three phases of power line. A single phase welder operates at low power factor and has a high KVA demand for relatively short periods of time. The three phase equipment makes possible reduced operating cost, because the load is balanced on all three phases, thus extending scope of resistance welding processes. Sciacky Bros., Inc., Dept. BB, 4915 W. 67th St., Chicago 38, Ill.

Available LITERATURE

MONARCH TOOLMAKER LATHE

The Monarch Machine Tool Company, Sidney, Ohio, announces the publication of a four-color, 24-page bulletin (No. 302) covering the company's Model EE Tool maker's lathe.

Design and construction features of the 10-inch sensitive precision machine are covered in the bulletin, which contains a number of illustrations, including several views of the electrical and mechanical details of the equipment. Complete specifications are listed and both standard and extra equipment are illustrated and described at length.

Copies may be obtained free of charge from Dept. BB, care of Monarch Machine Tool Co., Sidney, O.

BUCKEYE ROTARY TOOL

Buckeye Tools Corp. of Dayton, Ohio offers a handbook for the selection of rotary type pneumatic tools to fit particular jobs. Four sections divide the book: according to grinder and wire brush; buffer and disc sander, drill and reamer; and screw driver and nut runner. A page is devoted to a description of each type and contains picture and specifications. Maximum peripheral speeds for various types and grades of wheels are indicated in a table, based on the American Engineering Standards Safety Code for the use of abrasive wheels. Buckeye Tools Corp., Dept. BB, Dayton 1, Ohio.

PAPER ILLUSTRATES DIVERSIFIED USE OF STEEL

Recently published by the steel jobbing firm of Joseph T. Ryerson & Son, Inc. is an 8-page newspaper illustrating end uses of steel with a series of unusual action type photographs.

Printed by the rotogravure process the paper rivals in interest and attractiveness the picture section of the Sunday edition of the leading metropolitan dailies. A copy

may be secured by asking for the Ryerson Steel Pictorial, issue No. 19. Address the company at any of its plants which are located at Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Buffalo, Philadelphia, Pittsburgh, New York, Bos-

THE DUMORE GRINDER

"Here's How," a 75-page handbook of methods for management, shopmen and production engineers by The Dumore Co., combines the experience of nearly one hundred different manufacturers and machine shops with various grinding problems. This is the first volume of the results of a wide study and others will be published from time to time as new material is accumulated.

Four sections of the book include applications of production grinding, tool room grinding, maintenance grinding and the Dumore Grinder line. Although the Grinder was originally designed for the special requirements of the tool room, scarcity of special purpose machine tools during the war caused grinders to be mounted on lathes, standard machine tools, rebuilt machine tool bases and a variety of special bases for production purposes. The handbook outlines methods used by other companies in adapting the Grinder to problems of their own. The Dumore Co., Dept. BB, Fourteenth and Racine Sts., Racine, Wis.

DEOXIDINE METAL CLEANER

Adequate cleaning is the key to good paint adhesion on metal, according to a folder published by the American Chemical Paint Co. The folder presents the story of Deoxidine, their phosphoric acid metal cleaner and rust remover. There are a number of grades, each designed for a particular metal cleaning job, and general information is given to indicate the type best suited for individual problems. American Chemical Paint Co., Dept. BB, Ambler, Pa.

HARDINGE FEED FINGERS AND PADS

Hardinge's new bulletin describes in detail the Style "B" Feed Fingers and Pads. Style B Master Feed Fingers are made with a hole through each leaf to form an anchorage for each half of the pad. The finger will last indefinitely. Pads are replaceable and come in hardened steel, nickel cast iron and bronze. Specifications for master feed fingers and pads which fit certain machines are covered. Hardinge Bros., Inc., Dept. BB, Elmira, N. Y.

HALLER SCRAP CUTTER

Haller Machine & Mfg. Co., Inc., announces an illustrated bulletin on the Haller Model D-611 Scrap Cutter—a compact, ram-driven unit which can be used on almost any punch press. Construction features are covered in detail, and complete specifications are included.

Copies of the bulletin are available upon request from Dept. BB, Haller Machine & Mfg. Co., Inc., 7940 Tireman Ave., Detroit 4, Michigan.

D-C SELSYN APPLICATION DATA

Many d-c selsyn remote-indicating instruments initially designed for aircraft use may be applied equally well to industrial applications. Information on the selection and application of d-c selsyn three-wire system indicators and transmitters is contained in a new bulletin GET-1304, now available from Dept. BB, General Electric Company, Schenectady, New York.

Featuring illustrations of three different transmitters and seven styles of indicators, the 20-page booklet outlines the principle of operation and supplies application data.

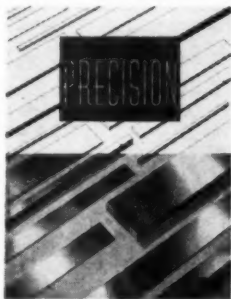
DU MONT BROACHES

A new du Mont catalog (12 pages) contains complete information and prices on "Minute Man" Keyway Broaches, Bushings and Kits and on du Mont Arbor Presses. Reference information on keys and keyways include dimensions for obtaining depths of keyseats, Woodruff key sizes for different shaft diameters, etc.

The catalog is now available on request from Dept. BB, The du Mont Corp., Greenfield, Mass.

MARSHALL FLAT STOCK

Users of ground flat stock will be interested in a new four-page folder just released by Marshall Steel, Box 58 BB, Lisle, Illinois. Included is a description of tests, heat treatment, grinding, and other details employed in the production of Marshall ground flat stock. Of particular interest is a table of sizes classified by thickness . . . weight and prices of individual sizes. Although Marshall sells exclusively through dealers, this manufacturer also invites inquiries for production runs of special sizes either annealed or heat treated to specified specifications.



RED STAR SAW

Red Star Products, Inc., have published a brochure on their Multiplex Saw. Features of the Saw are left hand miters, movable table, center suspended track, ball bearing assembly and automatic recording rip scales. The brochure lists specifications and includes a picture of the Saw. Red Star Products, Inc., Dept. BB, Cleveland, Ohio.

FARVAL LUBRICATION

"Studies in Centralized Lubrication," published by The Farval Corp., Cleveland, Ohio, presents case histories of users of their system of lubrication. The system operates by delivering oil or grease under pressure to a group of bearings from one central station in exact quantities, as often as desired. The back cover carries a list of field offices to serve customers. The Farval Corp., Dept. BB, 3249 E. Eightieth St., Cleveland 4, Ohio.

SHOP PROCEDURE FOR GRINDING CUTTING BITS

By George Burnley

In my experience, the output of many fine machine tools has been reduced due to faulty grinding of the cutting bits. In addition to slowing production rates, dull or poorly shaped bits produce inaccurate work and severely strain the parts of the driving machine. True enough, the operator of a planer, for instance, is expected to know how to grind his tool to the best possible advantage and generally may be quite capable of sharpening tools for run-of-the-mill jobs. However, on new setups or special work to which he is not accustomed, he is obliged to experiment with angles of rake, clearance, lips, offset, etc., which may not prove correct for hours or even days. I have, therefore, evolved a scheme to standardize the best and most efficient cutting tools in a large production shop.

Securing a half dozen two by four foot panels of $\frac{1}{4}$ " plywood, I had each painted white and checkered off into 4" numbered squares. Next, I made several dozen wooden blocks $\frac{1}{2}$ " x $\frac{1}{2}$ " x 3", to simulate the steel tool bits. Finally, in spare time, going from one machine to another I accumulated and cataloged the actual bits which had proved the best for each job. At last, after duplicating the bits in wood, I fastened, with thumb screws, each wooden tool to its appropriate place on the board, representing the respective type of machine to which it belonged, and hung the panel near the grind stone.

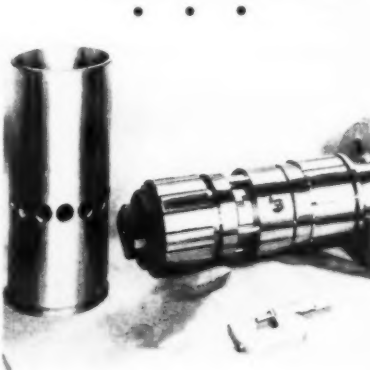
In practice, the machinist grinding a bit for his machine, examines, or if necessary, unscrews the dummy from the board and duplicates it exactly by shaping his tool on the stone as indicated.

This simple aid has proved so satisfactory in saving time and boosting production that these tool sharpening identification numbers are now carried on cards attached to shop blueprints or distributed on paper slips a day or two prior to retooling for changing setups.

MANDREL REDUCES SCRAP

A diesel engine manufacturer found it necessary, in grinding a cylinder liner,

to locate laterally from port holes instead of from the conventional rings or pins. He used a dual-sleeve expanding mandrel to hold the liner. A spur gear shaft and two racks inside the mandrel actu-



ated the locator, likewise on the inside, from the face plate. The same rigid holding in another instance led to a reduction in rejects from 1800 pieces out of every 2400 to less than 1%. Work pieces of various lengths can be accommodated by merely changing spacers and locating points.

Made by Erickson Tools Division, 2309 Hamilton Ave., Cleveland 14, Ohio.

BRITISH HOLD 1948 EXHIBITION IN COPENHAGEN

Arrangements have been made, with the approval of His Majesty's Government and the Danish Government, to hold an All-British Exhibition in Copenhagen in September, 1948.

The Exhibition will be organized by the British Import Union of Copenhagen in collaboration with the Federation of British Industries, as was done in the case of the successful British Exhibition in Copenhagen in 1932.

Steps to organize the Exhibition are now being taken and, as soon as the necessary plans and other information for intending exhibitors are completed, a further announcement will be made.

WARNER & SWASEY TURRET LATHE

The 16" Electro-Cycle Turret Lathe represents seven years research on the part of Warner & Swasey to develop a machine for working non-ferrous metals (brass, bronze, aluminum, etc.). The machine is described in whole, in part and in examples of actual shop use in the new 12-page bulletin, available immediately.

The machine possesses flexible two-speed motor, provided with a brake and designed for rapid reversal, suitable for most types of non-ferrous work. The spindle is the only moving part in the head of the machine. There are no gears, clutches or sliding parts. The Warner & Swasey Co., Dept. BB, 5701 Carnegie Ave., Cleveland 3, Ohio.

CENTERING MACHINE

A six-page booklet introduces the M.R.E. single and double-head Centering Machine, manufactured by Manchester Repetition Engineers, Ltd., England. The machine centralises and holds the work-piece ready for centering. Changing from one job to another may be done quickly and concentricity of the centers with the diameters can be maintained within .001" at production rates of up to 500 per hour. Cross drilling attachment is also described. U. S. distributors are Accrey-lon, 130 W. 42nd St., N. Y. 18, N. Y.

DRIVE-ALL GEAR BOX AND BRACKETS

The Drive-All Gear Box, Brackets for mounting units on machines, and units for Brown & Sharpe Automatics are featured in a six page folder. Photographs and specifications describe the products. Cross section drawing gives clear picture of Gear Box, and sketches of Mounting Brackets further depict uses on various types of machines. Drive-All Mfg. Co., Dept. BB, 3400 Conner Ave., Detroit 14, Mich.

AIR-WAY EQUIPMENT

The Air-Way Pump and Equipment Co. are offering several bulletins outlining the features of their Air-O-chek Water Bibs and Air Guns and Valves. The patented ball and socket connection between the valve and the internal lever contribute to leakproof dependability, ease of operation and maintenance economy. Air-Way Pump & Equipment Co., Dept. BB, 569 W. Van Buren St., Chicago 7, Ill.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

Quick Acting JOHNSON FURNACES

Turn the Heat

ON TOOLROOM BOTTLENECKS



Treat high speed steels, harden high carbon steels, braze carbide tipped tools in your own plant.

JOHNSON
Hi-Speed
No. 120

1300° F. in 5 minutes
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Compact, powerful, and remarkably economical in operation. Gets the job done quickly to save time and gas. Easily regulated. Hardens any steels. Ideal for small parts. Firebox 5x7¹/₂x13¹/₂. Complete with Carbofrax Hearth, G.E. Motor and Johnson Blower.

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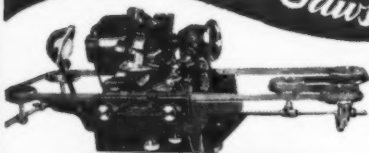
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SAW SHARPENER**

- HACK SAWS
- BAND SAWS
- CIRCULAR SAWS
- MEAT SAWS

HOWE AND SON Inc.
HINSDALE N. H.

NEW BRISTOL TIME CYCLE CONTROLLERS

The Bristol Company, Waterbury, Conn., has just published a 12-page bulletin, No. C305, on its new line of Model C500 Impulse-Sequence Time Cycle Controllers. The bulletin gives detailed information about the newly developed Model C500 Cycle Controller for tire presses, plastic molds, and general process operations. The booklet is liberally illustrated with line drawings to show principle of operation and method of use on typical plant processes.

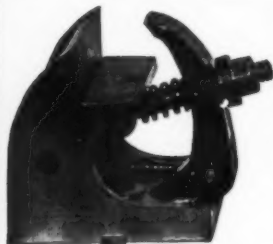
A copy of this new catalog may be obtained upon request.

GAS CARBURIZING EQUIPMENT AND PROCESSES

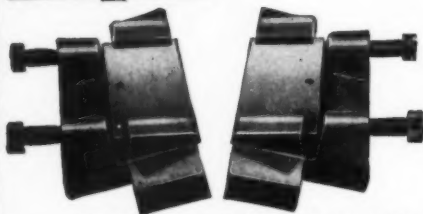
A new 16 page bulletin, SC-134, entitled, "Modern Gas Carburizing Processes and Equipment" has just been released by Surface Combustion Corporation, Toledo 1, Ohio.

The booklet constitutes a comprehensive compilation on modern gas carburizing. The bulletin tells how modern gas carburizing is accomplished and explains the related processes of Suspended Car-

HART MILLING FIXTURES



Hart Milling Fixtures firmly hold any shape stock—Round, Hexagonal, Octagonal, or Square for machining, automatically aligning the stock with the machine. Fixtures may be set up in horizontal or vertical position. The grip holds the work on bottom as well as on back. They have proved their efficiency in thousands of shops throughout the nation as well as abroad. Made in 4 sizes for stock from 1/2 to 5 inches. Shipped in pairs unless otherwise ordered.



HART MACHINE VISE JAWS

Highly efficient on any machine table, the angular jaws firmly hold the work down. Quickly and easily installed by clamping or bolting into place. The hardened tool steel jaw measures 3"x6"x1 1/2", the angle edge serrated.

HART MACHINE COMPANY

26 Mather Street

Dorchester - Boston

Massachusetts

burization, Carbon Restoration, and Dry Cyaniding.

Charts, graphs, and tables of an engineering nature as well as many photomicrographs of steel processed by the different heat treatments add to the value of the booklet as a reference work.

Copies may be obtained from Dept. BB, Surface Combustion Corp., Toledo 1, O.

DURANT TOOLS

Durant Tool Supply Co., distributors of tool and press room supplies and equipment, are distributing a 25-page catalog, attractively bound in red leatherette. Each subject is separated by tabbed dividers.

The section on Press Room machinery discusses slide feeds, roll feeds, stock straighteners, stock reels and special springs such as compression, extension and torsion springs. Springs of square wire, designed for punch and die work, are also listed. Durant Tool Supply Co., 155 Orange St., Providence 3, R. I.

SIMPLEX TRACK JACKS

Templeton, Kenly & Co., Chicago, manufacturers of Simplex Jacks for use in the marine field, the utilities of industrial engineering and construction, has recently issued a new descriptive bulletin on its Simplex track jacks. The center spread of the bulletin describes in detail the various new improvements added and features retained in this single acting track (or trip) jack.

Listed on the bulletin's back page is a wide selection of single acting jacks, bridge jacks, journal jacks and push-and-pull jacks. Specification charts on all these Simplex jacks are included. For full information on any of these new Simplex Type-A track jacks write for Bulletin T & B 47, Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill.

ASM NOMINATES OFFICERS FOR 1947-48


Francis B. Foley, Philadelphia metallurgical research head, has been nominated for the office of president of the American Society for Metals of Cleveland, Ohio by a committee of the 21,000 members of that body. Four other of the nation's prominent metallurgists have been nominated for the posts of vice president, treasurer and two trustees. All nominations are for 1947-48.

W. H. Eisenman, national secretary of ASM, made the announcement from Society headquarters in Cleveland. Mr. Eisenman explained that nomination is tantamount to election when the Society meets in Chicago in October of this year during the National Metal Congress and Exposition.

Mr. Foley, superintendent of Research for the Midvale Company in Philadelphia's suburban Nicetown, holds the office of ASM national vice president and previously was treasurer and national trustee of the nation's third largest technical society.

Dr. H. K. Work, manager of Research and Development of the Jones and Laughlin Steel Corporation, Pittsburgh, was nominated for the ASM vice presidency. F. L. Spanagel, engineer of the Industrial Department, Rochester Gas and Electric Corporation, Rochester, N. Y., received the nomination for the two year term as treasurer. Dr. E. G. Mahin, professor of Metallurgy and Head of the Department, Notre Dame University, and C. M. Carmichael, vice president, Shawinigan Chemicals Limited, Stainless Steel and Alloys Division, Montreal, Quebec, Canada, were nominated for two year terms as national trustees of the Society.

A. L. Boegehold of Detroit, General Motors research executive, is the outgoing president.



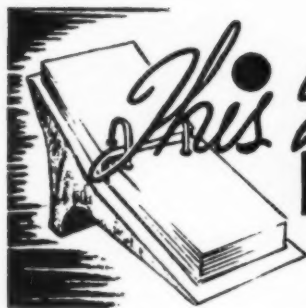
Grobet

COMBINATION OUTSIDE and INSIDE TUBE DEBURRING FILES

From 3/16" to 2 1/4" O D in 16 sizes. High speed steel ground from the solid after hardening. Makes 45 chamfer outside, 30 inside. Adjustable to increase or decrease relative chamfer between inside and outside wall of tubing. Speed ranges from 50 to 250 r.p.m. according to size. Also sold in sets in special wooden box. Write for technical details. Order from your favorite supply house.

GROBET FILE CO. OF AMERICA

421 CANAL STREET NEW YORK 13, N. Y.



This Month's **INDUSTRIAL FILMS**

THE CYLINDRICAL GRINDER

Norton Company, Worcester 6, Mass.
20 minutes. Color. Sound. 16 mm. Obtainable from Norton Company.

The picture tells of the importance of precision in the industrial world, precision which is essential in modern production.

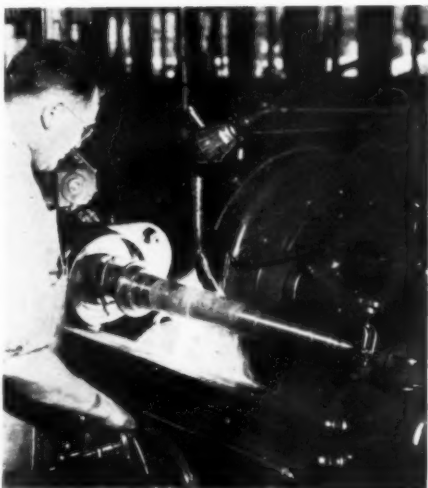
All the operating levers, handwheels and controls which govern the movements of the wheel head, table, and work of a typical cylindrical grinding machine are described.

In this lesson is shown how to mount, balance and true the grinding wheel, the importance of mounting the work dog correctly, adjusting the work drive pin, setting the table dogs, and the procedure in advancing the wheel to the work. Steady-rest manipulation is also shown.

This is one of a series on "Lessons in Grinding" available to industrial apprentice schools, foremen's groups, vocational schools, colleges and universities—wherever machine shop practice is being taught. Norton Company does not promise that the films will transform any grinding operator or apprentice into an expert but they will point out many

facts about grinding that are important for every operator to know. Norton also asks that an allowance of three to four weeks be made between time requested

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• • •

and time desired.

PORTER-CABLE APPOINTS NEW VICE PRESIDENT

In announcing the appointment of Mr. Douglas M. Lyon as Sales Manager of the Porter-Cable Machine Co., Syracuse 8, N. Y., succeeding H. L. Ramsay, who has been made Vice President in charge of Merchandising, President D. J. Ridings explained: "The addition of Mr. Lyon is in recognition of the fact that we are now in a buyer's market, and greater emphasis will be placed on selling."

"Vice President Ramsay has been relieved of much of the detail connected with managing sales, so that more time may be devoted to thinking and planning, and to merchandising the line."

THE WAY OUT

The Goodyear Tire & Rubber Co.
Akron 16, Ohio.

27 minutes. Color. Sound. 16mm. Obtainable from Goodyear.

For years, the human back provided the only method of transporting coal from its source to its destination—eleven centuries ago, the monks of Durham in Britain carried "sea coal" on their backs . . . stones mined from the sides of cliffs by the wind and the sea; when the supply of surface coal was exhausted, men had to dig coal from tunnels in the earth—the source of the coal changed, but not the mode of transport—the miner and his family carried it out. Later, wheels were added, then animal power replaced human power; and finally steel wheels, tracks and electric motive power followed.

Today, Goodyear's Coal-Flo Belts offer still another means of carrying coal from the mines. In a modern mine, equipped with belt conveyors from face to tippie, the flow of coal begins at the face, loading onto the room conveyor belt. It transfers to the room entry belt, then to the main entry belt and surge bin. From the surge bin, a constant flow is fed onto the slope belt and into the tippie.

Not only does the film tell the story of the conveyor belt but it points out advantages of using it. It adapts itself easily to the uneven pitch of the seam; men may install additional sections of belt between production shifts by use of metal fasteners, without stopping production; a central electrical station controls all belts within the mine; all belt fabrics are tested for resistance to mildew growth, impact

abuse, constant abrasive action at loading points, etc.

The film is available to mining companies, engineers, etc. and may be obtained from Goodyear.



A loaded conveyor belt speeds by tracks once used by cable cars.

New MIDGET ARBOR PRESS \$1500. DEL.



Here is the new MIDGET ARBOR PRESS for assembling operations. Also adapted for light metal and plastic cut-off. This press has been designed with provisions for return spring and adjustable stop screw. Because of its few parts it is unusually sturdy for its size and compactness. Every part has been machined accurately from special tooling, guaranteeing perfect performance.

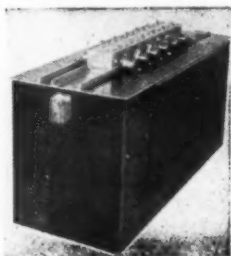
TABLE OF SPECIFICATIONS

3" clearance under spindle 2 x 1 3/4" size of pad
1 1/8" clearance to column 1 13/16" length of stroke
2 1/4" diameter of work 3/4" bearing each side

MFR'D. BY TUNSTEAD MACHINE & TOOL COMPANY

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Also Pittsburgh Lock Machines, Pipe and Elbow, Beading, Turning Machines and all other Sheet Metal Working Machinery—

Your inquiries invited.

Maplewood Machinery Co.
2634 Fullerton Ave. Chicago, Illinois

SAFE PRACTICES IN METALWORKING— ENGINE LATHE

The Jam Handy Organization, 2821 East Grand Blvd., Detroit 11, Mich.

Black and white. Slide film. 35 mm. Obtainable through purchase from The Jam Handy Organization. Running time varies with length of film.

Eleven slide films in an educational tone compose the newest slide film kit, presented by The Jam Handy Organization.

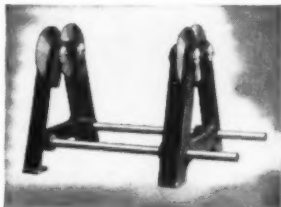
Subject matter includes material on kinds and parts of lathes, safety practices, operation of a lathe, carriage controls, chucks, centers, and center holes. Information on lathe operation covers starting, stopping and reversing, setting lathe speeds, estimating lathe speeds, lathe controls; recessing, chamfering, filing, polishing and knurling; and installing and removing draw-in collet attachment, chucking work, installing and removing faceplates, mounting work and lathe rests.

The kit is for sale at The Jam Handy Organization, 2821 East Grand Blvd., Detroit 11, Mich.

No leveling required . . . with Anderson Balancing Ways

If your shop handles rotating parts these sturdy and dependable balancing ways would be highly profitable equipment to use. In accurate balancing and truing operations they save time, labor and money.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.



Swing	Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000



Write for Bulletin 8-5

ANDERSON BROS. MFG. CO., Rockford, Ill.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

NEW TECHNICAL BOOKS

WELDING SYMBOLS

By Vincent C. Gourley. Published by The Bruce Publishing Co., 540 N. Milwaukee St., Milwaukee 1, Wis. Publication date — May 1, 1947. 115 pages. \$2.50.

In the past, the type of welding desired has been denoted by copious explanatory notes on mechanical and structural drawings. A new system, consisting of a series of symbols of letters and figures, eliminates these lengthy notes.

The standards and symbols explained in this book are recognized by the American Welding Society. General standards for the use of arc- and gas-welding symbols as well as resistance-welding symbols are explained. Illustrations consist of two parts, drawing and explanations. The drawing specifies the weld in the same manner as an actual mechanical drawing or blueprint. The explanation interprets the drawing, showing pictorially the exact location and outline of the weld.

Everyone who has occasion to refer to drawings or blueprints should be thoroughly familiar with welding symbols as well as the welder, the draftsman, the cost analyst and the engineer. This work on the uses and meanings of welding symbols will be of particular interest to workmen and students in the fields of drafting, design, welding and engineering.

fessor of Industrial Engineering, Purdue University. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. Publication date February, 1947. 232 pages, \$4.00.

This book is intended to provide a systematic, practical and scientific treatment of motion and time study. Material and procedures have been arranged in an orderly and consistent fashion. Several chapters are devoted mainly to a systematic discussion of techniques and procedures for the improvement of work methods and the measurement of human performance, among them a discussion of product and man analysis; operation, and man and machine charts; micromotion study (involves movie camera); stop watch study on recording time values, rating and allowances, etc.

The aim has been to organize basic principles so that all can follow them. Illustrative examples are examined in detail so that the reasoning processes involved may be comprehended with minimum effort. Graphic analyses used in these illustrative problems are presented in the form in which they would normally appear in practice.

The book concludes with problems and bibliography for further study.

SYSTEMATIC MOTION AND TIME STUDY

By Marvin E. Mundel, Associate Pro-

THE PORTAL-TO-PORTAL ACT OF 1947

200 8½ x 11 pages; \$5; published by The Bureau of National Affairs, Inc., Washington 7, D. C.

Here is a book which analyzes the portal-to-portal law, recently enacted by Congress—to tell what it means to more than 557,000 establishments covered by wage-hour standards, how it affects the nation's wage-earners, what it does to existing portal pay claims which piled up since last November.

The book tells how the new law grew out of the aftermath of the Supreme Court's famed Mt. Clemens decision, progenitor of the wave of portal-to-portal suits that swept the country during the fall and winter of '46; it analyzes carefully the complex statute enacted to dam the flood of suits, and appraises the new law's effect on the three federal wage and hour laws to which it applies.

In succeeding chapters, the book takes up portal-pay claims and suits. It demonstrates the manner in which existing claims are outlawed or may be compromised; indicates what will be done in reference to future claims on such subjects as travel, changing clothes, waiting, preparing reports, etc.; and discusses who may bring suits and how they will be brought.

Further chapters define uniform time-limits on wage-hour suits, describe the nature of "good faith" defenses by employers on alleged violations, analyze the new "area of production" regulations, and forecast forthcoming action challenging the law's constitutionality.

The book is a product of group business journalism. It is written so that it may be understood by those touched by the provisions of the law, and includes Congressional debates and committee studies from which the law evolved, as well as the text of the statute.

E. G. BAILEY TO HEAD ASME IN 1949

The 1947-48 President of The American Society of Mechanical Engineers will be E. G. Bailey, New York, vice president of The Babcock and Wilcox Company, manufacturers of steam generating equipment. Mr. Bailey was nominated for the office at the Semi-Annual Meeting of the society, held in Chicago June 15-19. Nomination is tantamount to election, since only one nominee is named for each office. He will succeed Eugene W. O'Brien of Atlanta.

Four regional vice presidents and three directors-at-large also were nominated.

Formal election will take place next fall, by letter ballot of the ASME membership of more than 21,000, closing on September 23. The new offices are as-

sumed at the close of the Annual Meeting, scheduled this year for December 1-5 in Atlantic City.

Regional vice presidents named, to serve two years, are:

Frank M. Gunby, associate of Charles T. Main, Inc., 201 Devonshire St., Boston—Region 1.

Paul B. Eaton, head of the mechanical engineering department of Lafayette College, Easton, Pa.—Region 3.

Thomas E. Purcell, general superintendent of power stations, Duquesne Light Company, Pittsburgh, Pa.—Region 5.

J. Calvin Brown, head of the firm of J. Calvin Brown, 704 South Spring St., Los Angeles—Region 7.

Directors-at-Large named are:

J. B. Armitage, vice president in charge of engineering, Kearney and Trecker Corp., Milwaukee, to serve three years.

A. L. Penniman, general superintendent of operations, Consolidated Gas, Electric Light and Power Co., Baltimore, to serve four years.

William M. Sheehan, vice president of General Steel Castings Corp., Eddystone, Pa., to serve four years.

A.S.M. ANNOUNCES CALENDAR OF EVENTS

The American Society for Metals, Cleveland 3, Ohio, announce the following events to be held concurrently with the National Metal Congress in Chicago, October 18 to 24.

National Metal Exposition
International Amphitheatre
Chicago, Illinois

October 18-24, 1947

Annual Meeting of the American Society for Metals.

Palmer House
Chicago, Illinois

October 20-24, 1947

Annual Meeting of the American Welding Society

Clerman Hotel
Chicago, Illinois

October 20-24, 1947

Annual Fall Meeting of the Iron and Steel Division and The Institute of Metals Division, American Institute of Mining and Metallurgical Engineers

Stevens Hotel
Chicago, Illinois

October 20-23, 1947

Annual Meeting of the American Industrial Radium and X-Ray Society

Continental Hotel
Chicago, Illinois

October 20-24, 1947

Shop Hints

AL-FIN ALUMINUM TIMING GEARS FOR AUTOMOTIVE USE

Successful development of aluminum timing gears with bonded-in steel hubs for automotive use has been announced by Al-Fin Corporation, Hollis, N. Y., subsidiary of Fairchild Engine and Airplane Corporation.

Perfected after two years of research and testing, the new gears are reported to be much stronger than the molded resin- and -fiber gears commonly used in automobile engines. They have longer life than molded resin gears because of the better wearing qualities of aluminum, and they stand up better under heavy loads, the announcement said. The company claims the gears are as quiet in operation as molded resin types.

Aluminum gears with steel hubs are expected to be especially suitable for heavy-duty use, as in engines of trucks and buses. The gears are composed of aluminum alloys chemically bonded to steel hubs which gives the bond a tensile strength of 6,000 pounds per square inch. The steel hubs are bonded-in to prevent the gear from "taking a set and walking off the camshaft."

Individual camshaft timing gears already have been operated over 100,000 miles under severe load conditions without failure, the company said. M. V. Little of the Al-Fin Corporation described one of the tests:

"One gear with a two-inch plain round steel hub, with nothing but the Al-Fin bond holding the aluminum to the steel, was given a 'shear test'. Automotive engineers attempted to press the hub through the gear in an effort to rupture the chemical bond between the two metals, but they were unable to budge it even at 98,000 pounds pressure.

"This same gear was then run 123 hours at 4,000 rpm on a breakdown test. Still standing the gaff, it was then installed in the engine of an inter-city

truck operating between Chicago and Pontiac, Mich. After 86,340 miles of operation in the truck, the gear was removed for inspection and no wear was discernible."

To date, gears have been made for three different engines of GMC Truck & Coach, and for Chevrolet and Studebaker models.

Aluminum alloys are used for strength, and aging of the casting obtains a Brinell hardness of from 85 to 120, depending on requirements. Several manufacturers have life-tested the timing gears for varying periods of as long as 2,000 hours at 4,200 rpm. Tooth loads vary from 1,500 to 2,700 pounds, depending upon design and aluminum alloy strength.

According to the manufacturer, this process of chemically bonding aluminum and its base alloys to iron and steel is a development which permits the fabrication of bi-metallic assemblies combining selected physical properties of both metals, and facilitates the production of units requiring both the qualities peculiar to steel and aluminum.

COMBINATION BLANK FORM AND TRIM DIE

The operation "Draw", as used in the metal stamping industry, has heretofore been done in a separate operation, leaving the trimming operation to be done either in a "pinch-off" die or in two separate operations of trimming in the partly formed stage and finishing in the formed.

The Simplex Tool Engineering Co., 2540 Park Ave., Detroit 1, Mich., have developed a die which eliminates from two to four operations in the forming of

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PHONE
R. O. 1772

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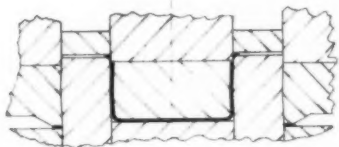


drawn shells, when the ratio (height divided by diameter) does not exceed $\frac{1}{2}$.

In the illustration shown, the blanking, forming and trimming operations are performed in one die, using a single action press. The metal is fed into the die and the outer ring, or rough blanking steel, cuts the required blank, which is then subjected to the drawing action of the inner ring. As the shell is drawn to its finished height, the trim or pinchoff steel is used to trim the shell to its exact height, leaving a flat even edge. Embossing can be put in the bottom of the shell

by the knockout ring, if required.

In reducing the number of operations on the shell shown it was possible to eliminate the "shimmy" trim die which is not suitable for small quantities and is also an expensive patented die require-



Velvone BELT RENOVATOR

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Removes oil, grease, dirt and other foreign matter from face of belt and pulley. Easily applied with squirt or pressure-type oil can, while belt is in motion.

Friction is increased and slippage reduced to a minimum permitting operation with less belt tension and greatly reduces pressure and strain on bearings.

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Formerly Whitlock Manufacturing Co.
11224 Locust Ave. Cleveland 2, Ohio

ing considerable upkeep.

It must be understood that the ratio of diameter to shell height is a factor in determining whether a previous forming operation should be used to produce a shell of given height and diameter and also that the corner radius must be taken into consideration.

BUFFALO PNEUMATIC CHIP GUN

A four-page bulletin describes the Buffalo Pneumatic Chip Gun used for removing cuttings from blind drilled and tapped holes.

The gun removes the hazard of flying chips present when cuttings are blown out of blind holes, by depositing them in the body of the gun. Two sizes are available—Model A for holes $\frac{1}{4}$ " to $\frac{3}{8}$ " diameter and Model B for holes $\frac{1}{2}$ " to $1\frac{1}{2}$ " diameter. Buffalo Machinery Co. Inc., Dept. BB, 838 Grant St., Buffalo 13, N. Y.

SILVER ALLOY BRAZING LAWN MOWER ROTORS

This is an interesting metal joining operation for several reasons. The outstanding feature is the joining of three steel parts—a spider, drive shaft and bearing retainer—in one operation. This is being done by Reading Hardware Co., 6th & Shaw Sts., Reading, Pa., in fast time with alignment between the parts held to close tolerances.

Parts come to the brazing station



cleaned and ready for assembly. A girl assembler first places four spiders in a ceramic fixture and brushes the center hole of each with Handy Flux. A $\frac{5}{16}$ " I.D. ring of Easy-Flo brazing alloy made from 3/64" dia. wire is then slipped on the drive shaft and the end of the shaft and the brazing alloy ring are liberally brushed with flux. A bearing retainer is placed over the shaft end and the two parts are then inserted in place on the spider. The fixture with four such assemblies is ready for the heating operation.

An induction heating unit with two brazing stations is equipped with jigs for aligning and maintaining close tolerances between parts, especially between the drive shaft and bearing retainer. The fixture holding the four assemblies is placed over the heating coils and all heating is done from the bottom. After considerable

experimenting this was found to be the most practical method. Heating coils do not interfere with the operation of the jigs which are lowered over the parts while heating. Heat can be concentrated on the heavier parts—the drive shaft and the spider—thus preventing warping in the lighter gauge bearing retainer. With coils so arranged the brazing alloy is drawn through the joint, bonding the parts together accurately and permanently.

Four assemblies are brazed at one time. It takes but 30 seconds or an average of $7\frac{1}{2}$ seconds each. With two brazing stations, one heating while the other is loaded a production of 3840 units can be maintained per 8-hour day. Final inspection calls for a full ring of alloy around the end of the drive shaft. Each part is given a shock test.

"LINCOLNWELDING" CENTERS LINKS FOR HOIST CHAINS

The S. G. Taylor Chain Co., of Hammond, Indiana, manufacturers of center links for hoist chains, report favorably on their adoption of the Lincolnweld automatic metallic arc welding process.

With this process, granular flux is deposited on the joint to be welded. Direct current produces the arc between the electrode and the joint. The resultant arc heat fuses electrode and parent metal, producing the weld. Flux adjacent to the arc melts, floats on the surface of the molten metal, then solidifies as a slag on top of the weld. Since the arc and molten metal are blanketed by flux at all times, the weld metal is completely protected from contact with the air.

An exclusive fabricating device, supplementing the facilities of the automatic welding process, is a water-cooled copper clamping fixture that holds the work and serves as a mold to retain the molten metal during the welding (see cut). It also molds the shape.

This copper mold is formed in two parts and is air-controlled by a foot pedal. The water in the mold is used as a cooling agent to prevent the arc from melting away portions of the mold when the arc is struck and to prevent the molten metal from fusing to the mold.

The links, themselves, are round or pear shaped and are made of round-stock alloy steel 8620 or SAE 4620 from $\frac{3}{4}$ -inch through $2\frac{1}{2}$ -inch diameters inclusive.

News of the industry.....

NATIONAL MACHINE TOOL SHOW ADVANCES DATE FOR MOVING EQUIPMENT INTO SPACE

The date for the moving of some \$16,-000,000 worth of machine tool exhibits into the Dodge-Chicago Plant for the 1947 Machine Tool Show has been advanced from August 25th to August 4th, the National Machine Tool Builders' Association announced in Cleveland.

This will provide an extra three weeks for the immense task of moving in, setting up, and placing in full operation the vast number of machine tools and other metalworking equipment which will comprise the world's greatest machine shop in a nine-day working demonstration. The Show will be open daily except Sunday, from September 17th to 26th. It will cover more than 500,000 square feet of space, approximately 12 acres, in the Dodge-Chicago Plant in Chicago, the huge industrial facility now occupied by the Tucker Corporation.

The number of exhibitors has grown to more than 275 for this fourth Machine Tool Show to be sponsored by the N.M.T.B.A. The three previous shows, 1927-1929-1935, were held in Cleveland.

In addition to more than 150 Association members who will exhibit the latest developments in machine tools, forging machines, and other metalworking equipment, there will be approximately 125 manufacturers of related equipment, including cutting tools of all kinds, measuring instruments, attachments and accessories, and some trade publications serving the metalworking industry.

Many of the machine tools shown at this first show of its kind in 12 years will be entirely new in design. Others will be long-tested machines with new

attachments and applications. One exhibitor will have 29 machines, all new in size, capacity, or application. Another will have 28 models and types, some entirely new in principle. A third will show 27 machines, many of them new. The seven machines to be shown by another exhibitor will have a gross weight of 400,000 pounds and a value of \$325,000.

The 2000 machines on display will show the entire range of the more than 200 different types produced by the machine tool builders of the United States.

REGISTRATIONS FLOWING INTO NATIONAL MACHINE TOOL SHOW HEADQUARTERS

Attendance at the Machine Tool Show to be held in the Dodge-Chicago Plant, Chicago, September 17th through 26th, may exceed the original estimate of 100,000, it was predicted by Swan E. Bergstrom, Chairman of the Show Committee of the National Machine Tool Builders' Association, and Sales Manager, The Cincinnati Milling Machine Company.

Mr. Bergstrom said a tremendous attendance, both from the United States and abroad, is indicated by the heavy flow of advance registrations being received daily at the Association offices in Cleveland.

Foreign visitors have been making their plans for months to attend the Show, and have been arranging their steamship and airline reservations. There will be a number of special flights for visitors bound for the Dodge-Chicago Plant from London and other points to New York. Railroad and airline officials in this country are making travel arrangements for the overseas visitors, and for the many thousands of visitors from industrial centers everywhere in the United States.

Already registrations have been re-

ceived from 22 foreign countries. Mr. Bergstrom reported. There will be, in addition, representatives from the resident offices in this country of Czechoslovakia, France, India, The Netherlands, Poland and U.S.R.R. An official party of 30 from the British Machine Tool Trades Association will sail from England on the Queen Elizabeth.

Countries from which registrations have been received are Argentina, Austria, Australia, Belgium, British West Indies, Chile, Colombia, Cuba, Denmark, England, Finland, France, Hawaii, Italy, Mexico, The Netherlands, Norway, Palestine, Portugal, Spain, Sweden and Switzerland.

A dinner in honor of the overseas visitors will be held on Tuesday evening, September 23rd, with Charles J. Stilwell, President of The Warner & Swasey Co., as toastmaster.

EARLE G. LEONARD OF BUFFALO FORGE PASSES AWAY

Earle Graydon Leonard, Manager of the Machine Tool Division of Buffalo Forge Company, well-known figure in the Machine Tool Industry, passed away in New York, on May 3rd after a short illness.

Mr. Leonard secured employment in the Order Department of Buffalo Forge Company in 1909. From a clerical position he progressed to the Sales Department and from that to Manager of the Tool Division.

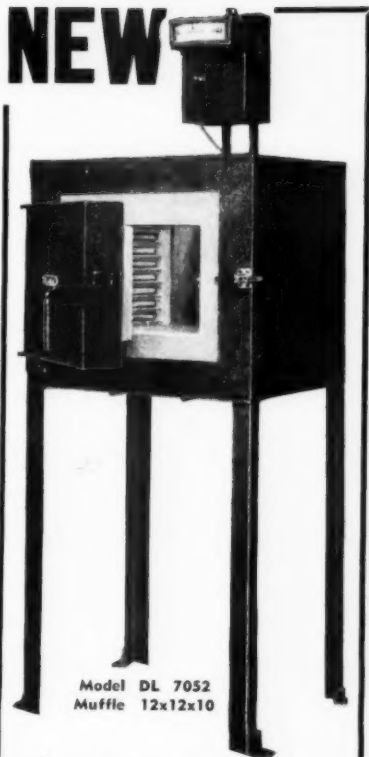
Before and during World War II, Mr. Leonard served on various important committees of the National Machine Tool Builders Ass'n.

Mr. Leonard is survived by his wife, Bertha, a daughter, Judith, and a son, Joseph.

RUBBER AS CAMOUFLAGE

A new wartime use for rubber has been found in Java. Elaborate breast works and pillboxes, built and cleverly camouflaged by the Japanese during their occupation of the Dutch East Indies, were constructed of bales of natural rubber. The rubber is being recovered according to a report received by Goodyear Tire & Rubber Co. officials from Louis Hochberg, who recently returned to Buitenzorg, Java, as plant manager of Good-year's tire factory.

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AUTOMATIC PLATING PLANT PRODUCES $1\frac{1}{2}$ ACRE OF PLATING EVERY EIGHT HOURS

The George L. Nankervis Co., 5442 Second Blvd., Detroit 2, Mich., completed in the record time of eleven months a completely automatic plating plant 660 feet long and 50 feet wide, with three-quarters of an acre of continuous plating machines for one of the largest manufacturers of automobiles.

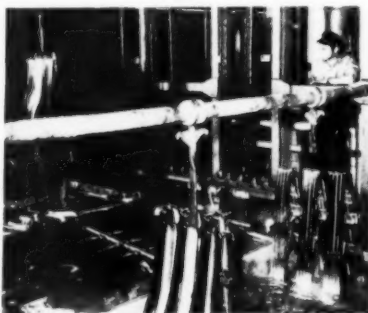
The plating machines were built by Meaker Mfg. Co. and consist of three sections — copper, nickel and chrome.

The first section for copper plating is 207 feet long, includes fifteen automatic operations requiring 52 minutes to complete the cycle. The main copper plating tank contains 58,000 gallons of copper plating solution, which is circulating constantly at the rate of 1500 gallons per minute and is filtered at the rate of 1260 gallons per minute. The circulating system passes through sixteen heat exchangers maintaining a constant predetermined temperature. By means of the pump equipment the entire content of the copper

plating tank of 58,000 gallons can be transferred to an adjacent storage tank in 25 minutes.

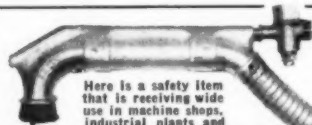
The nickel section, which is 250 feet long, includes fourteen different tanks and operations, requiring 64 minutes for a complete cycle. The nickel plating tank contains 67,200 gallons of solution which is the equivalent of $8\frac{1}{2}$ tank cars. The

solution is filtered constantly and heated with 15 heat exchangers. Part of the solution passes through an electrolytic purification tank which is connected to a General Electric 2000 ampere, 6 volt rectifier.



Parts immersing and emerging into and out of the plating and cleaner tanks—the intermittently operating rinsing sprays and provision made for ventilation wherever required.

The chrome plating section is 139 feet long and includes ten automatic operations. The main chrome tank, having a capacity of 15,700 gallons, is divided into two compartments, allowing two lanes of work which may be operated at different cathode current densities. The chrome plating solution is circulated through both heat exchangers and coolers to maintain the pre-



Here is a safety item that is receiving wide use in machine shops, industrial plants and factories. It cleans depth holes thoroughly and safely without endangering the operator's eyes. Made of tempered aluminum. Complete with all attachments.

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determined temperature. A master panel controls each automatic machine. If a particular machine is stopped, a trouble light flashes at the master panel and indicates the source of the trouble. That machine cannot be started again until the trouble light is off and a warning horn has sounded for at least thirty seconds. Responsibility for safety is also assured by a stop cord available the entire length of the automatic machines.

The plating capacity of these machines in one 8-hour day is 22,500 square feet of copper, nickel and chrome, or a total area of 67,500 square feet or about an acre and a half of plated surface per eight hour day. The electrical energy for the plating procedures is supplied from 22 Chandeysson motor generator sets, ranging in size from 5000 amperes at 6 volts to 15,000 amperes at 12 volts, with a total capacity of 285,000 amperes. If converted to proper voltage, this could supply sufficient electric power for 7,000 homes.

Demineralizers with capacity of 3000 gallons an hour furnish water for the rinses preceding the plating and the plating tanks. Temperatures are automatically maintained. As the work is being raised from the tank, rinse sprays are operated by means of remote control switches, relays, and timers. Total capacity of all the tanks on this project tops the 500,000 gallons of 55 tank cars of solution.

Ventilation is assured by 32 blowers with a total capacity of 434,000 cubic feet per minute.

In construction of this plant, 8600 tons of dirt were excavated for the pit, 4200 tons of concrete and 92 tons of reinforcing steel were required for finished concrete surface. There were 400 tons of structural steel in the automatic equipment, 600 tons of steel in the tanks, and 90 tons of sheet metal in the exhaust system.

E. W. BLISS ANNUAL REPORT

Operations of the E. W. Bliss Company, 451 Amsterdam Ave., Detroit 2, Mich., for 1946 resulted in net earnings of \$1,386,734.57, after taxes, according to the annual report which has been issued by Marshall M. Smith, president. This is equivalent to \$13.87 per share of \$2.25 preferred stock or \$3.29 per share of common stock after payment of regular preferred dividends.

Mr. Smith reported that the company's reconversion program had largely been accomplished during the year. The cost

of additions to the company's fixed assets amounted to \$1,085,669.65. This included the completion of the expansion program at the Hastings, Mich., plant and the equipping of a shop at the Salem, Ohio, plant devoted exclusively to the production of weldments required at the company's other works in Brooklyn, Toledo and Cleveland. As a result, deliveries of medium-size and large-size mechanical presses have been substantially improved.

The backlog of unfilled orders with which Bliss terminated its 1946 operations, according to the report, indicates full capacity and an efficient basis of production during 1947.

Dividends aggregating \$225,827.85 were paid during the year to preferred shareholders. Because of the additional working capital required by the company's expansion program, no dividends were paid on the outstanding common stock during the period covered by the report.

"During the year," the report continued, "the company has sent its representatives extensively into the foreign field, both in Latin America and in Europe. The business from these and other foreign territories is expected to increase in accordance with our ability to satisfy the demand."

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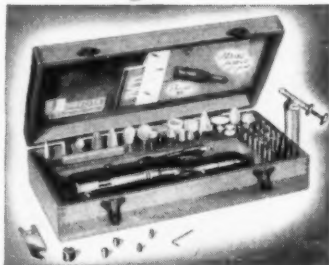
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Choose **PRECISE 40** for 40,000 r.p.m. and 1/5 H.P. in an electric handtool weighing only 40 oz. **Built for production.** Mills, grinds, polishes, deburs any material from file-hard steel to bronze, plastics, wood or rubber. Imagine, with carbide cutters **PRECISE 40** mills the hardest steel!

PRECISE 40 in cool, shockproof, plastic case operates on AC-DC. Use it as a handtool or as a motorized quill in vise, lathe, mill or on your production set-up. Many accessories and rotary tools available. Also **COOL-FLEX** Flexible Shaft attachment with 9-oz. air-cooled handpiece.



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1331 CLARK ST.,
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DESIGN AXLE LATHE TO OPERATE WITH TUNGSTEN CARBIDE TOOLS

Visitors at Consolidated Machine Tool Corporation, Rochester, New York, are witnessing the results obtained with the new Betts-Bridgeford Center Drive Axle Lathe designed to operate with high speed tungsten carbide tools. Representatives of American railroads are hailing the lathe as an important development in axle turning.

The lathes are designed for accurate turning and burnishing of journals and turning wheel fits on standard AAR car

axles from 4 1/4" x 8" up to and including 6 1/2" x 12".

The recent introduction of tungsten carbide has sped up tooling of this material to machine steel. Consolidated engineers have kept pace with these new developments and have designed machines to accommodate the new cutting tools.

Tests have shown that satisfactory performance of tungsten carbide tools in axle lathes is dependent upon high cutting speeds. This called for greater rigidity of the machine and the elimination of any excess play between the moving parts.

In designing the Betts - Bridgeford Center Drive Axle Lathe to operate with tungsten carbide tools, engineers mounted the herringbone bull-gear of the center driving head between Timken bearings, thereby insuring smooth performance at high speeds. Timkenized tail

stock construction, similar to that employed on Axle Lathes and Journal Truing Lathes, is used in conjunction with the Timkenized center driving head.

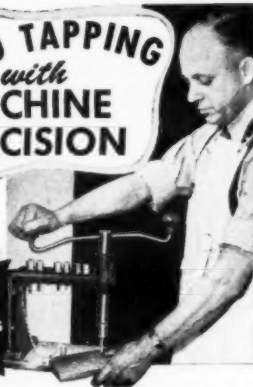
The new machine is equipped with such features as hardened steel bedways with bronze carriage liners, opposed burnishing attachments, turret toolholders and the improved type automatic chuck.

The automatic driver chuck is self centering and closes automatically when the machine is started making for rapid production. The jaws are released by momentarily reversing the motor.

HAND TAPPING *with* MACHINE PRECISION

\$52.50

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Anyone can operate a Dahlstrom Tap Guide. Just fasten it to a post, slip a Tap Adaptor into the spindle and turn the handle. Cuts tap breakage down to zero. \$52.50 F. O. B. Minneapolis, including 7 Adaptors. At mill supply houses, or Dahlstrom Mfg. Co., 416 South 6th St., Minneapolis 15, Minn. ASK FOR CIRCULAR.

Dahlstrom TAP GUIDE



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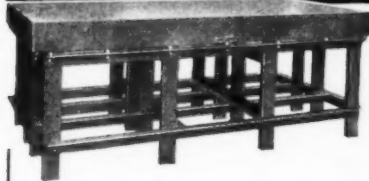
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CHALLENGE Semi-Steel Layout Surfaces PLATES

Insure the accuracy of repeated assemblies and layouts. True rigid surfaces of fine grained special analysis semi-steel and with precision ground or planer finish. Deep ribbing of the 6 inch deep plates prevent sagging or yielding under load. Furnished in 13 standard sizes with or without sturdy arc-welded steel stand with lock-leveling screws.

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Made of fine-grained special analysis semi-steel castings. Specially heat-treated and precision ground to required accuracy. **SOLID and BOX PARALLELS, ANGLE PLATES, V-BLOCKS and UNIVERSAL IRONS** in a wide range of sizes. Write today for latest Catalog!



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MIDGET MILLS - 1/4" Shanks

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BALL SEAT REAMER

Representatives of the International Civil Aviation Organization, International Labor Organization, International Federation for Documentation, International Dairy Federation and the United Nations Educational Social and Cultural Organization were present at the meeting to discuss cooperation on standardization matters of particular interest to each group. A joint committee was appointed for the purpose of promoting such cooperation.

The ISO Council approved a resolution presented by the International Electrotechnical Commission, agreeing to serve as the electrical division of the 27 nations' international body. Under the agreement, the IEC maintains its name and technical procedures.

Mr. Coonley opened the meeting of the ISO Council, on which 11 nations are represented, saying "this movement

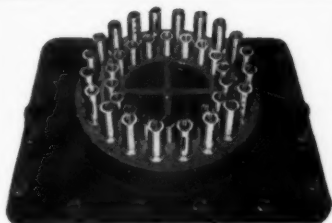
and this meeting are of great significance to the reconstructions, the progress, and the future peace of the world.

"It is my conviction that the greatest assurance of permanent world peace can come from the unrestricted exchange of goods and services between the nations great and small."

Mr. Coonley urged the Council to dedicate its efforts to the advancement of industry and commerce throughout the world in order to raise the general standards of living and to promote the general well being of people of all nations.

STANDARDIZATION GROUP GAINS CO-OPERATION OF FIVE INTERNATIONAL ORGANIZATIONS

Five international organizations made arrangements for cooperation with the new International Organization for Standardization (ISO) at its opening meeting recently in Zurich, Switzerland. Howard Coonley president of the ISO and chairman of the Executive Committee of the American Standards Association, made the announcement in a cable to the American Standards Assoc., 70 East Forty-Fifth St., N. Y. 17, N. Y. recently.



Pictured: a 38-Spindle Heavy-Duty Drill Head.

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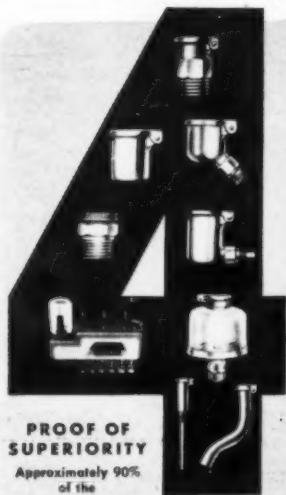
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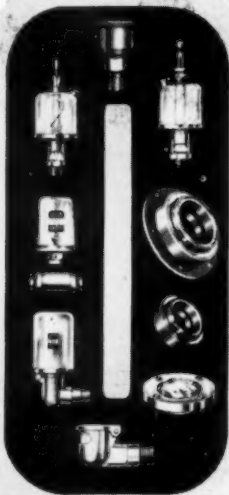
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**NEED FOR MARKETS DICTATES
AID TO OTHER NATIONS**

The increasing dependence of the United States on other countries for raw materials depleted by the war, and the need for foreign markets to maintain high levels of agricultural and industrial activity, make it the height of folly to shrug off the reasonable requests of other nations for aid to rebuild their economies, William S. Swingle, executive vice president of the National Foreign Trade Council of New York, declared recently at the annual election luncheon of the Export Managers Club of Chicago (1 N. La Salle

St., Chicago) in the Congress Hotel.

If the European recovery plan proposed by Secretary Marshall is believed to be sound and good, then similar programs should be worked out for other areas, with all factors being drawn together into an integrated economic policy covering the nation's relations with the rest of the world, Swingle said. "We would have a better idea of our course of action, how much we could afford, and what would be expected of other countries in the way of cooperation and self-aid," he continued.

In addition to rehabilitation programs, steps should be taken to reduce international trade barriers and to provide opportunities for safe American investments abroad, Swingle stated. "Important developments in the field of foreign trade and investments during the years ahead

will hinge on our attitude towards the other nations of the world. We can only lose in a world of economic impoverishment and political chaos."

At the club's election, Joseph L. Cunningham, president of the Consolidated Manufacturers Export Company, was elected president. E. W. Plagge, Latin American sales manager of the International Automatic Electric Corporation, and A. L. Jacobs, export manager of the Holly Pen Corporation, were elected vice presidents, and C. C. Coldren, foreign trade counselor, was re-elected secretary-treasurer. Five new directors were also elected.

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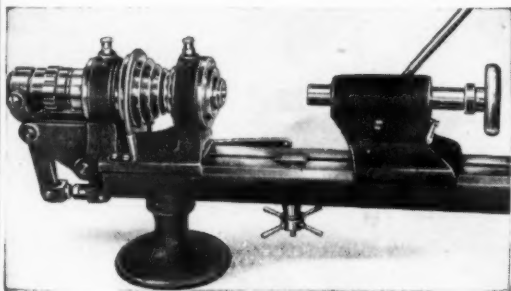
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away the spent water supply of a community, as sewage, only if the pollution effect of the wastes can be satisfactorily absorbed by the flow. A heavy pollution load will degrade the stream and interfere with its proper utilization by others, which is a violation of riparian rights under the common law.

"If the stream is overburdened by wastes, the sewage-borne solids must be extracted and the chemical and biological character of the effluent changed" to a more effective degree. The recovered sludge, scum, grit and screenings must be disposed of also.

It was determined by a survey of the U. S. Public Health Service that in 1942 the country needed: for sewers 1.2 billions of dollars; municipal sewage treatment .7 industrial waste treatment .15 at municipal plants and .16 at inde-

INDUSTRIAL WASTE PROBLEM CRITICAL IN MIDDLE WEST

The pollution of streams by industrial waste presents a problem of nation-wide scope, with needs for sewage and trade wastes treatment most critical in large industrial centers of the Middle West, Professor George E. Barnes of the Case School of Applied Science, Cleveland, said in a paper read at a process industries session of The American Society of Mechanical Engineers, holding its Semi-Annual Meeting. Defining the problem generally, Professor Barnes said:

"A watercourse may be used to carry

pendent plants. Needs for sewage and trade waste treatment are most critical in the highly concentrated population belt of urban communities extending from the New England and north Atlantic states west through the Great Lakes, Ohio River, and upper Mississippi River drainage basins.

Estimated needs in industrial waste treatment plants in millions of dollars were detailed for certain states as follows:

Illinois 22.1 millions of dollars; Indiana, 9.0; Iowa 7.2; Kentucky 5.1; Michigan 6.1; Minnesota 5.4; Ohio 16.2; Pennsylvania 35.0; West Virginia 4.9; Wisconsin 3.1.

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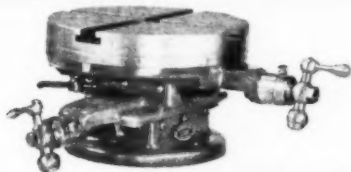
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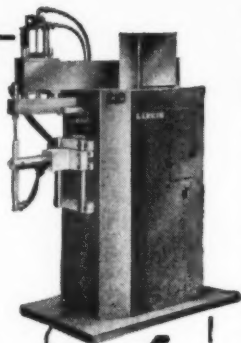
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HOW NATIONAL WEALTH IS CREATED

By A. H. Ruthman, V. P.
 The Ruthman Machinery Co.

It is not the amount of labor we do that creates wealth, but its effectiveness. Wealth increases through effective application of labor. For example, let us think of a hundred people working on an island and entirely dependent on their own labor. As the labor of all the hundred is needed to find enough food to keep them alive, that food is their sole wealth. All their efforts are needed to feed themselves. They cannot have clothes, or houses or furniture or any other com-

forts. But, suppose clever ones among them invent a hunting weapon so effective that only fifty people are needed to feed the Islanders. In that case fifty persons are free to do other jobs. These fifty can set out to do other work such as constructing huts, fashion garments, etc. The little community becomes richer because a particular form of work has been saved, and a new method provided. Suppose the fifty remaining food getters, by further inventions, become twenty-five. Then these twenty-five can produce the food needed, which formerly required the combined efforts of the one hundred Islanders, and seventy-five are now free to do other work. So again the Islanders become richer because labor has been saved through effective means of invention and application.

Since this fact is true, it definitely follows that a nation can only become richer by means of applied organization and inventive genius. The arrangement of work in such a fashion and its fruitful application is important. Not everyone has this gift of happy arrangement. The difference in profits earned by one firm over another firm making the same or identical products is the result of its management and applied methods of operation. The neglect of this most important economic truth, results in poverty and distress. Correct organization and invention saves manual labor, and in saving it, sets it free to do other work.

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such as fishing reels, timing devices, control motors, etc. often require small gears with specially designed teeth. Beaver Gear engineers are trained to assist you in the design and application of these gears. In our modern plant, crafts-

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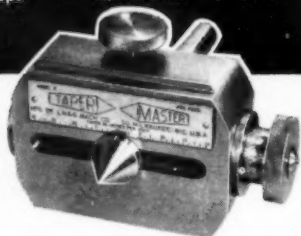
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- Cuts tapers from 1/1000 to 4 inches per foot
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The No. 4 TAPER MASTER is intended for heavy duty work in tool rooms or for industrial production setups. It cuts tapers up to 4 inches per foot.

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GOODYEAR ASSEMBLES CONTAINERS FOR STORING NAVY PLANES

Announcement was made today of the acquisition of 115,000 square feet of additional floor area by the Goodyear Aircraft Corporation, Akron, Ohio, for manufacturing operations on the new Navy canning program designed to preserve war planes in fly-away condition for periods up to five years.

Goodyear Aircraft will assemble huge steel containers in which planes will be kept at six Naval Air Bases scattered over the country. Built for the Navy,

under contract with the Youngstown Steel Door Company, the containers will house more than 2,000 surplus carrier and trainer aircraft.

The storage of surplus airplanes involves sealing the complete unit, with wings folded, in metal containers constructed from 10-foot panels of corrugated steel. Each unit is sufficiently large to house several planes, and they will be linked together in "families" of four to six. Each family will be equipped with a special dehumidifying unit to remove deteriorating moisture.

The Navy considers this more satisfactory for all-weather storage of small aircraft than "cocoons" of sprayed plastic. Larger airplanes not adaptable to the canning type of preservation may continue to be stored under the "cocoon" program, however.

When completed by Goodyear Aircraft, the containers will weigh approximately 28 tons per unit, and will be in two standard sizes—19 feet wide by 140 feet long and 24 feet wide by 130 feet long. The frames and panels will be formed by the Youngstown Steel Door Company and shipped to Akron for assembly by Goodyear Aircraft.

To facilitate handling, the individual sections will be shipped in the flat form from the Akron plant to the various sites of erection. About 444 cans will house 800 fighters, 450 attack planes, and 750 trainers and utility aircraft.

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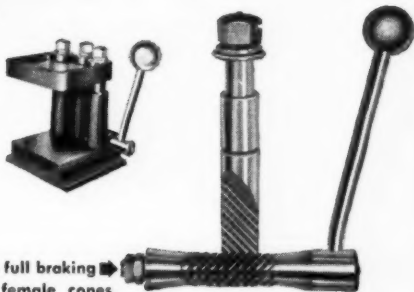


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V. A. POPULATION FIGURES

Veterans Administration estimates that the number of living veterans and members of their families will reach a peak of 43 percent of the nation's population within the next 5 years and decline in percentage thereafter.

The present and anticipated ratio of the veteran-family population to the entire population during the next 10 years is: Jan. 1, 1947—32%. Jan. 1, 1952—43%. Jan. 1, 1957—41%.

VA defines a veteran's family as a unit, which may include a wife, children,

parents, and relatives by blood, marriage, or adoption, living together and headed by a veteran. Parents and other relatives heading families which include veterans are not counted, although the veterans in such cases are included in the figures.

On the basis of this definition, VA computes the following estimates of the number of veterans and members of their families for 1947, 1952 and 1957: Jan. 1, 1947—46,000,000, Jan. 1, 1952—62,300,000, Jan. 1, 1957—62,500,000.

Thus, the veteran-family population is expected to show a rapid growth in the next five years, compared to the total population, and then to level off between 1952 and 1957 while the total population continues to rise.

The net result is that veterans and their families will comprise a larger percentage of the total population in

1952 than they do now or than they will 10 years hence.

VA made the projections to study the importance of their implications to various VA programs during the next 10 years.

The figures are based on separate estimates for 4 categories: (1) living veterans, (2) wives of living veterans, (3) children under 18 of living veterans, and (4) other relatives in homes of living veterans. These components further are distributed according as the veterans served in World War II or served in any other war.



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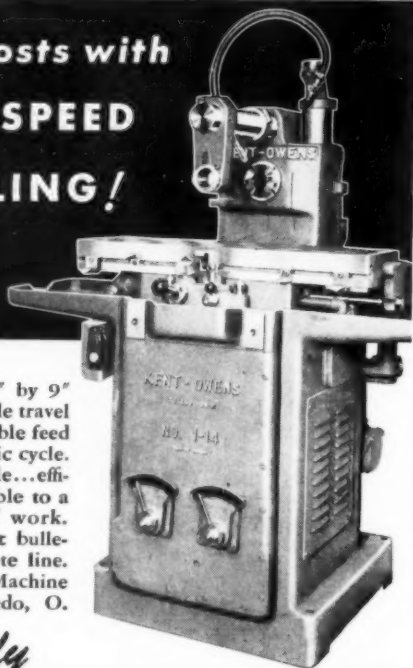
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PROPOSALS FOR STRENGTHENING SMALL BUSINESS

A program designed to strengthen small business in management, finance, and taxation, and improve competitive opportunity is contained in a statement on national policy made public by the Committee for Economic Development, 285 Madison Ave., N. Y. 17. The statement, which follows two years of study by the Research and Policy Committee, was made public by Paul G. Hoffman, CED chairman and president of the Studebaker Corp., and Raymond Rubicam, chairman of the Research and Policy

committee.

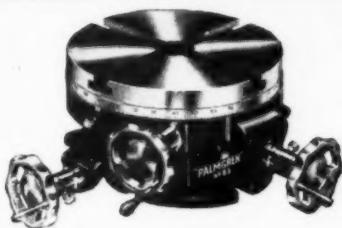
Lack of managerial skill may be remedied by an increase in technical aids to small businesses by manufacturers, suppliers and trade associations, special training courses at colleges and universities, research by the Department of Commerce, etc.

A primary financial problem is fear of the loss of long term credit and equity capital. Remedies suggested include expanded counselling service and issuance of credit manuals by banks; establishment of new capital banks as extensions of the present commercial banking system; the avoidance of subsidies, direct loans or unrestricted guarantees on commercial loans to business by the federal government, except in periods of emergency.

The committee favors reforms in present provisions of the taxing sys-

tem which bear down on small business with special severity. Among recommendations are a general reduction in business and personal income taxes, carrying of losses over a period of six years to be applied against subsequent earnings, and averaging of income taxes over a certain period to reduce discrimination against those with irregular incomes and allow greater latitude for depreciation.

The statement pointed out that 98 per cent of all business firms in America are small and provide about 35 per cent of the nation's business and employ 45 per cent of all engaged in business.



PALMGREN NO. 83

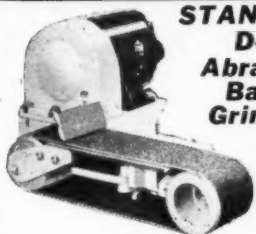
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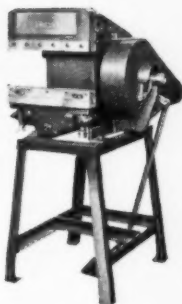
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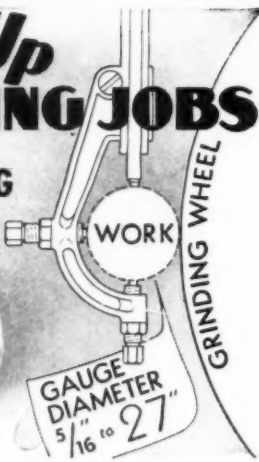
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TRADE COUNCIL PROTESTS TO TRADE COMMISSION

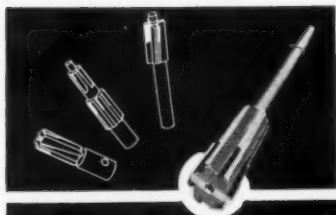
It was disclosed at administrative headquarters of the American Fair Trade Council, a national educational organization of manufacturers of branded products, has protested to the Federal Trade Commission "the failure of the Commission at any time to consult the Council in any of its so-called studies of Fair Trade."

The Council's president, John W. Anderson, stated that the Commission, in its statements presuming to define Fair Trade comprehensively, has omitted sig-

nificant facts: Under Fair Trade laws, a branded product must be in open competition with other products of the same general class; collusion between manufacturers of similar products in the determination of prices thereon is a serious criminal offense against Federal Law and violates each and every one of the Fair Trade Acts; and there can be no lawful coercion of a manufacturer, reseller or consumer in his determination of his decisions as affecting any Fair - Traded product.

Anderson asserted that "We now find arrayed against Fair Trade an incongruous trinity of bedfellows, including (a) Collectivist travelers endeavoring to break down all resistance against incentive - destroying commercial piracies, (b) predatory supercapitalists seeking extensions of their monopolies of retail distribution, against which monopolies wage earners have no sure defense other than Fair Trade, and (c) men of the FTC and other governmental agencies perhaps jealous of the fact that Fair Trade brings its vast benefits to the public without interference or dictation by any governmental bureau, committee or agency."

Supporting its charge of viciousness in the "price-baiting loss-leader formula," the Council's letter to the Commission states: "... the loss-leader formula has been employed successfully by giant monopolists to individual branded products and, in promotion to entire stores,



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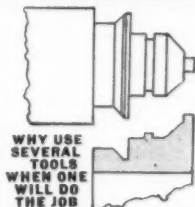
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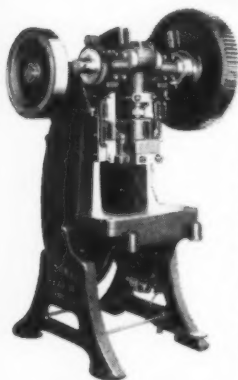
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Arc welding plays an important part in the renovation of diesel - electric locomotive equipment and railway cars at the shops of the International Railway Car and Equipment Manufacturing Company of Kenton, Ohio.

Two 60-ton Alco-G-E diesel-electric locomotives which had seen duty in Iran with the Army were recently overhauled, remodeled, and streamlined for the Alasca Railroad. This company is also rebuilding and streamlining railway cars formerly operated by the Bureau of

Mines, for this same railroad.

The roof of each railway car is streamlined by welding panels of steel sheet over a frame work of channel and bar stock. Following completion of the center seam operation, the panels are double - butt-welded along the entire length of the roof with fillet welds, using General Electric Type W-20 electrodes. The ends of the metal panels are welded to the body of the car with horizontal welds on each side of the car.

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Braces are tack-welded to the underside of the skirting and body of the car for added reinforcement.

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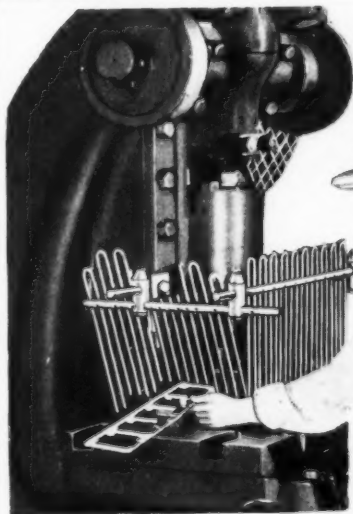
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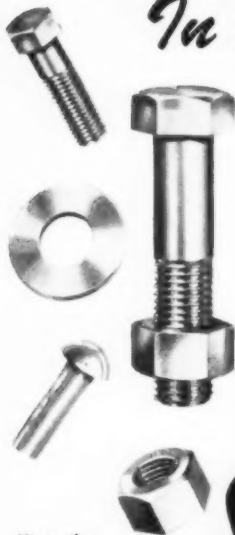
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ITA REPORTS WORLD-WIDE INTEREST IN AMERICAN TECHNIQUES

E. Jerome Webster, Secretary General of the International Trade Association, Munsey Building, Washington 4, D. C., reports that, as the result of ITS's extensive council activities and correspondence in 65 countries and colonial trading areas, considerable evidence has been accumulated which indicates that American manufacturing methods and technical "know-how" are greatly desired by overseas businessmen. Foreign industrialists need the information to circumvent license,

businessmen for the purpose of helping them extend their business overseas. The sale of American goods around the world would be materially increased as a result of this gesture. H. Fred Willkie, brother of the late Wendell Willkie and Vice-President in charge of production for Joseph E. Seagram & Sons, Louisville, Ky., is Chairman of the Board of ITA. Aaron L. Ford, former Representative, is President. The Association is setting up Councils in all countries now open to American business to facilitate reciprocal movement of goods and ideas.

tariff and monetary blocs and encourage increased trade.

"An increasing number of inquiries, which usually request contact with U. S. — ITA members for the purchase of finished goods, now ask to be put in touch with American manufacturers interested in establishing branch factories abroad", said Mr. Webster.

"In many lands, raw materials and native industry can provide great opportunities for U. S. manufacturers," Mr. Webster pointed out, "and it is apparent to us, that under present conditions, what is now needed is the alliance of overseas resources with American production 'know-how', management and sales techniques to materially increase bilateral trade and benefit international exchange of goods."

International Trade Association, (ITA) was formed this year as a non-profit association to aid "small"



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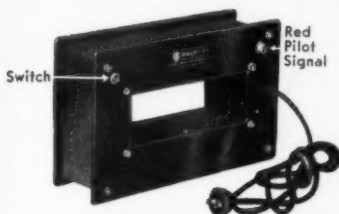
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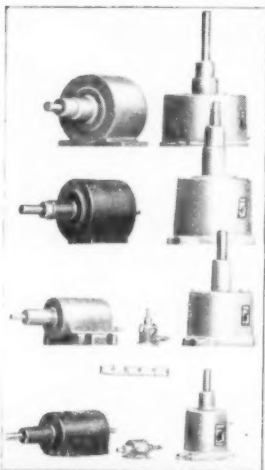
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FORD & UAW-CIO REACH TENTATIVE AGREEMENT

The following statement was issued jointly by Richard T. Leonard, national Ford director of the UAW-CIO, and John S. Bugas, vice-president and director of industrial relations of the Ford Motor Co.

"After eight weeks of intensive bargaining, the Ford Motor Company and the UAW-CIO have reached tentative agreement on a new labor contract that marks an important step forward in providing security for Ford Motor Company employees. Included is the first retirement plan for hourly rate employees in the

maintenance employees and to core-makers and jobbing molders.

"The proposed new contract has grown out of complete agreement between the company and the union on the general objectives of providing Ford employees the maximum degree of security practicable with production of the best cars and trucks at the lowest cost. The combination of wage increase and retirement program brings that goal nearer.

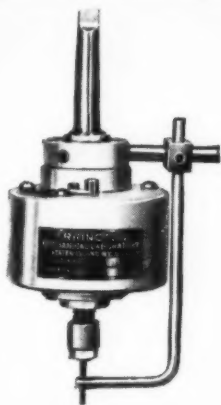
"We are confident that the details of the program and other matters pertaining to contract will be completed shortly."

automotive industry.

"The contract provides for a straight 7-cent an hour wage increase. Other financial gains will be in the form of the retirement program which will be put into effect as soon as possible after ratification of the contract by the union and the company.

"When finally signed, the contract will run for a minimum of two years. It can be reopened for negotiation only on economic matters, and only once during the two years. The wage agreement will be retroactive to May 31, 1947, the date on which the old contract expired.

"With the wage increase, the average hourly pay of Ford employees will be approximately 3 cents an hour more than those of major competitors. An additional 5-cent an hour increase will be given to 10,000



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ATTEMPT TO STRENGTHEN FAIR TRADE LAWS

"Reputable manufacturers and resellers doubt that either President Truman or Governor Dewey will be duped by the attempt of piratical discount houses to obscure the fact that Fair Trade laws have served to prevent unreasonable price increases," said John W. Anderson, President of American Fair Trade Council, in an interview at the Council's administrative headquarters.

"Discount houses fight Fair Trade because those houses are beasts of prey of our economic system. . . The discount

laws at present merely permit the manufacturer of a branded product, if sold in open competition with other products of the same general class, to name the prices at which his product may be sold."

"American Fair Trade Council has recommended to President Truman and to Governor Dewey that they each give moral support to a strengthening of all Fair Trade Laws to require that all manufacturers of branded products determine the exact prices at which their products must be sold, assuming of course that those products are in open competition with (similar) products."

house 'jumps' merchandise out of its normal channels to avoid reputable retailers."

The discount house gives a few consumers the benefit of uneconomic prices and reputable retailers in self defense discontinue the branded products. The public in that area accepts substitutes, or worse, employment declines in the factory of the preferred product, according to Anderson.

"Such 'meter jumping' trickery, if not curbed, leads to wage depression and mass unemployment. It makes for a dog eat dog economy."

"The best protection afforded the public against such demoralizing piracy comes from State Fair Trade Laws," Anderson contended. "Those



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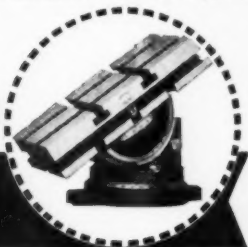
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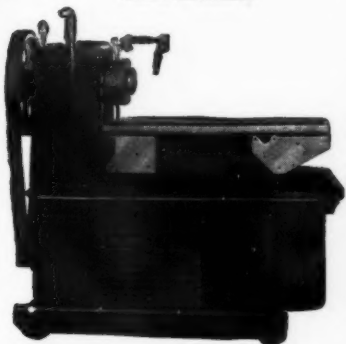


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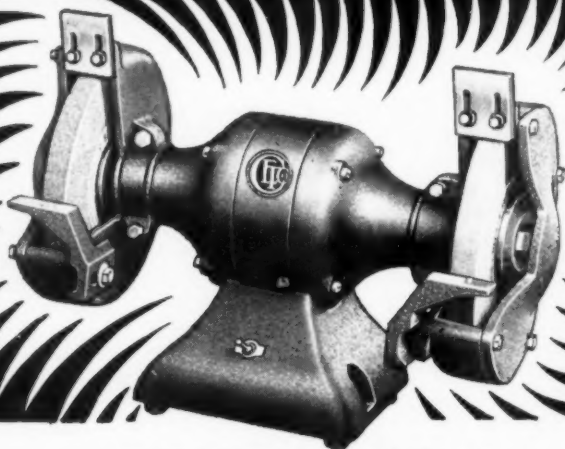


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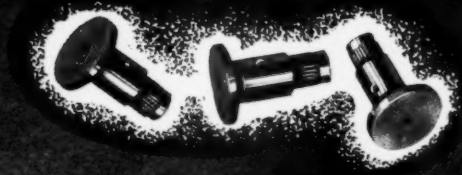
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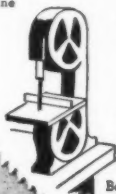
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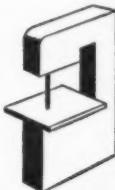
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